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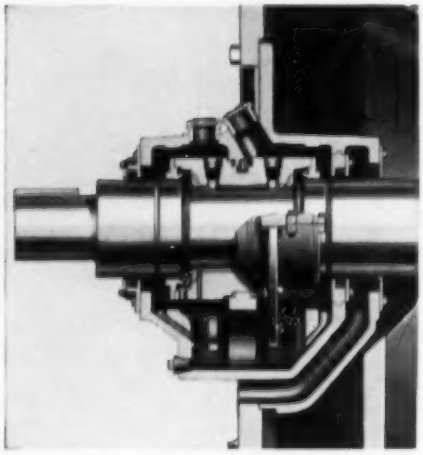
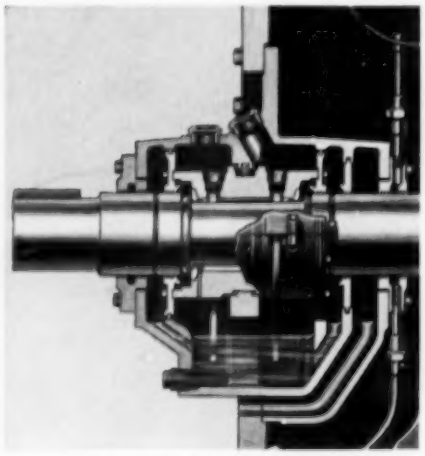
Directory for plant engineers

NEW Bearing Design Means Better Motor Performance

Allis-Chalmers capsule-type sleeve bearings now perfected for complete motor line



Standard capsule-type sleeve bearing



High speed capsule-type sleeve bearing

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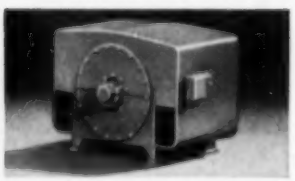
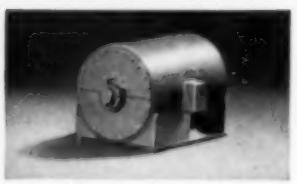
Drip-proof or splash-proof cage motor

Synchronous or wound-rotor motor

High speed cage motor

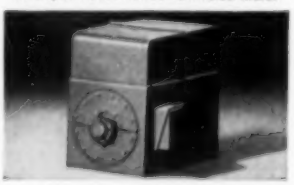


Weather-protected motor



Totally-enclosed fan-cooled motor

Totally-enclosed forced-ventilated motor



Water-cooled or inert-gas-filled motor

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Volume 75 Number 2

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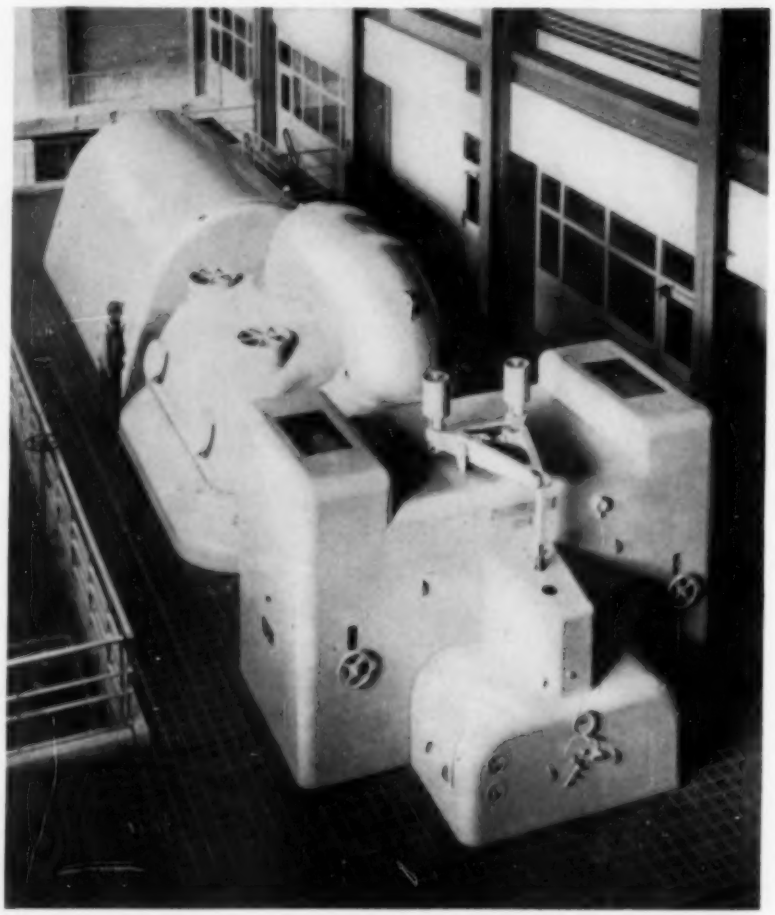

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SOUTHERN POWER AND INDUSTRY

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No. 2

FEBRUARY, 1957

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

February, 1957

◆ CORROSION EXPERIENCE at Plant McManus (Georgia Power Company), featured in this issue, reports on the very successful application of cathodic protection to intake structure trash racks and traveling water screens, all underground piping and structures, fuel oil storage tank bottoms, condenser and turbine oil cooler water boxes, and miscellaneous tanks.

Technical details cover major corrosion problem (large assortment of dissimilar metals in contact with one another); corrosion study; installation of complete cathodic protection system; and results. Many of Plant McManus' corrosion problems have been solved and corrosion of underground piping is greatly decreased.

◆ ALUMINUM SOLDERING PROBLEMS? Because it conducts heat away from the soldering point so rapidly, and because the tough oxide film on its surface interferes with tinning, aluminum requires special materials and techniques.

Glass fiber brush soldering, the latest variation of the friction method, is the newest and potentially the best method (according to Reynolds Metals) of soldering aluminum. It employs a glass fiber brush as a special abrading tool to remove the oxide coating by abrading it down through a layer of molten solder. The new glass fiber brush or abrading tool will be available from many sources, including Reynolds Metals' building supply outlets, hardware stores, etc.

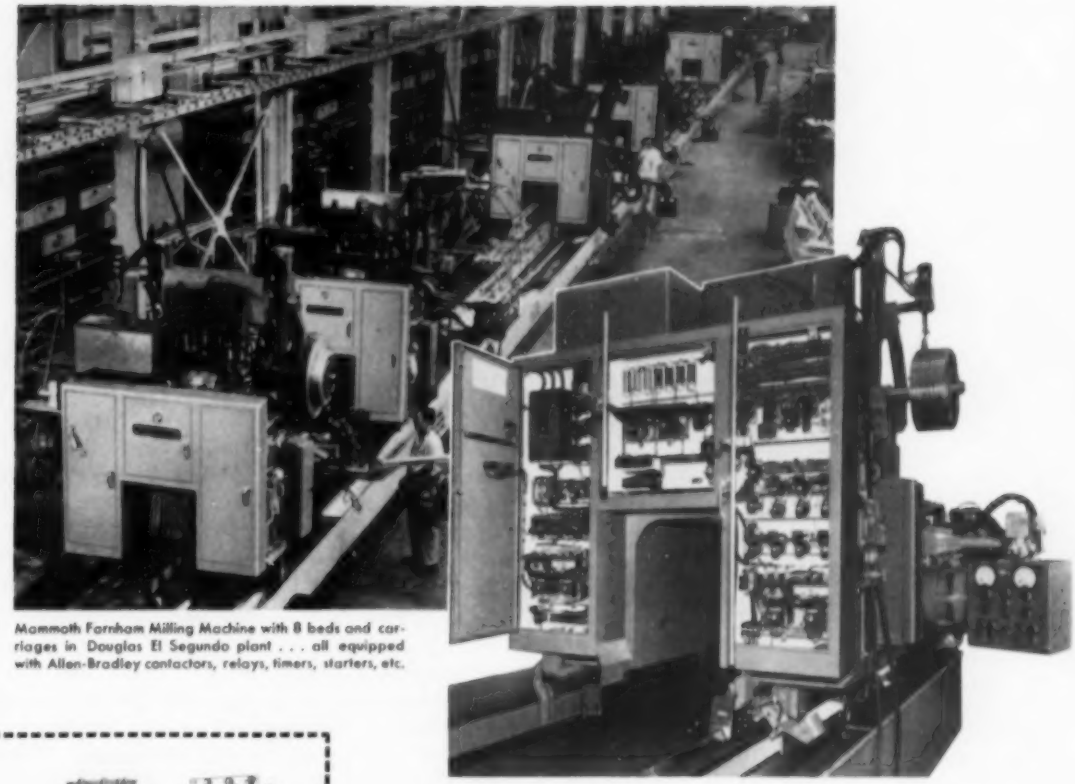
Complete technical information on the glass fiber brush soldering development is published in "Technical Advisor"—issue No. 33, available at no charge from Reynolds Metals Company, 2500 So. Third St., Louisville 1, Ky.

◆ WEAR-RESISTANT coating of sprayed steel on aluminum cylinder walls is opening new horizons to designers of the lighter-than-ever all-aluminum engine. The conventional aluminum piston does not function well bearing directly on an aluminum cylinder wall, however, it does work smoothly on a ferrous alloy surface.

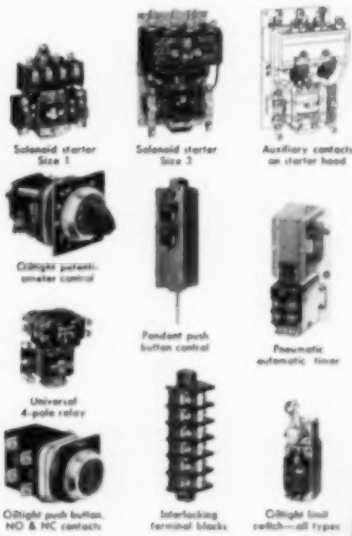
Recent success of this hard steel-sprayed face is the result of the unprecedented adhesion between the steel bearing surface and the aluminum cylinder achieved by Metallizing Engr. Co., Inc.'s patented "Sprabond" process which requires a super-thin layer of pure molybdenum between the aluminum and steel to serve as a bonding material.

The sprayed steel bearing surface should accelerate the development of the all-aluminum engine—an achievement which will bring the economics of reduced weight, longer serviceability, and lower manufacturing and maintenance costs.

◆ SOUTHERN SALES SERVICE—In the back of this issue, SPI has published a Directory of Southern & Southwestern Manufacturers'



Mammoth Farnham Milling Machine with 8 beds and carriages in Douglas El Segundo plant . . . all equipped with Allen-Bradley contactors, relays, timers, starters, etc.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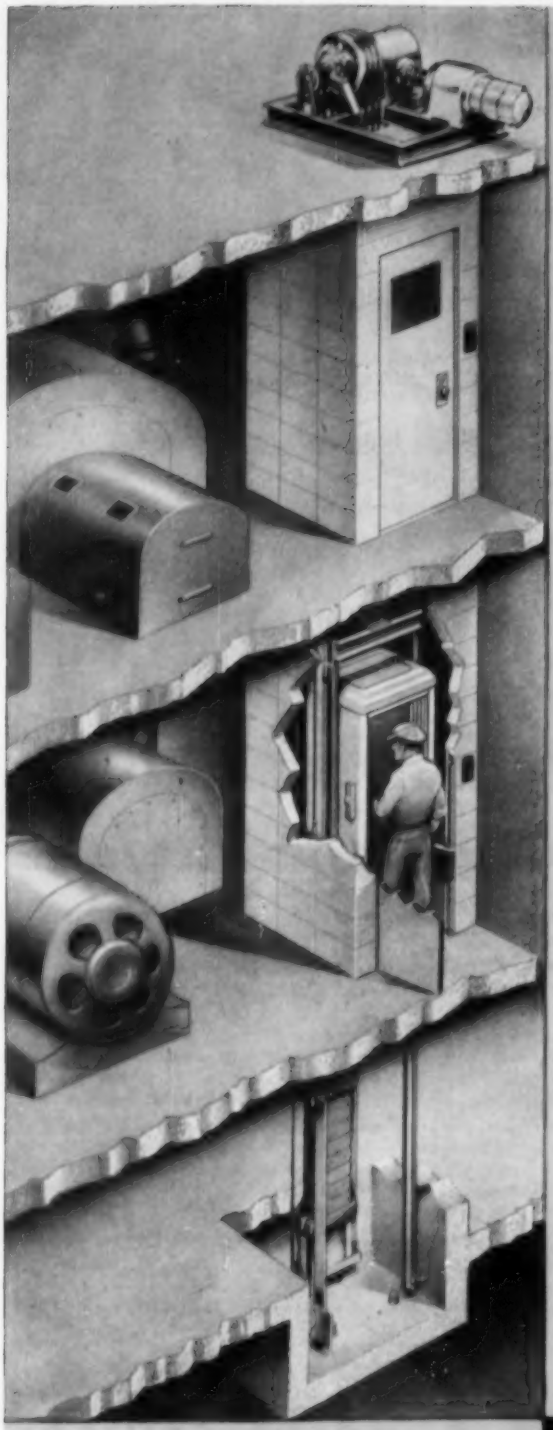

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◆ INDUSTRIAL EXPANSION—1956 industrial construction (around $5 billion) reflected a concentrated desire for expansion, particularly on the part of the steel and process industries. Industrial construction will continue at present high levels in 1957, according to Walter Kidde Constructors, Inc., engineers and builders of New York and Houston.

The company foresees little adverse effect on 1957 industrial construction from the increased cost of money. They point out that the cost of money is negligible compared to the loss involved in operating an inefficient plant or in foregoing necessary research and control facilities in a competitive market. Credit restrictions are seen as possible stumbling blocks, particularly for smaller companies.

The merger of small, old line, family-held companies with larger corporations interested in diversification is still a major factor in new plant construction and plant modernization. Small companies, previously starved for capital, are now able to modernize and expand. Walter Kidde officials also emphasized that construction lags behind mergers by two or three years, due to the time required to correct inadequacies discovered in the new organization. Thus the mergers which took place in 1956 will not have their full effect upon construction volume until 1959.

◆ FIRST POWER PLANT in the country to be planned as a combined gas turbine-steam turbine generator unit will be built by the Crisp County Power Commission at Cordele, Georgia. Exhaust from a gas turbine will flow into a steam boiler where, in combination with pulverized coal, it will produce steam for a steam turbine.

Although several other power stations are using gas turbines to improve efficiency of steam turbines, the Georgia installation will be the first specifically designed and engineered to combine a gas turbine and steam turbine unit. Both the gas and steam turbine-generators are being built by G-E.

Design highlights were recently announced by W. Dan Sinclair, manager and chief engineer of the Commission. A 5,000 kw simple-cycle, single-shaft G-E gas turbine will exhaust into a B&W boiler to develop 600 lb of 825 F total temperature steam for a 12,500 kw G-E steam turbine-generator. Maximum capability of the combined cycle is estimated at 17,500 kw. Operation is scheduled for 1958.

◆ SCREW-ON NEOPRENE CLEATS will convert any conveyor or elevator belt into a cleated-belt. The "Tatch-A-Cleat" manufactured for T. H. Hinchcliffe, 1450 La Loma Rd., Pasadena 2, Calif., may be screwed into any belt quickly and easily. All a mechanic needs is a punch and screwdriver.

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SEALED DRY-TYPE transformers, rated 300 to 2000 kva, 15 kv and below, are virtually maintenance free. Ideal where atmospheric problems exist.

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Before you buy a medium transformer, contact your nearest General Electric Apparatus Sales Office. You'll discover how faster shipment, easier installation, reduced maintenance, and longer life add up to more for your transformer dollar. General Electric Company, Schenectady 5, New York. 416-13

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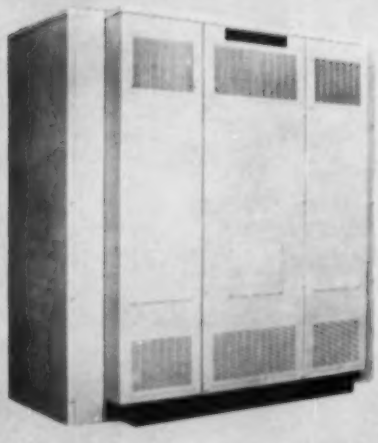

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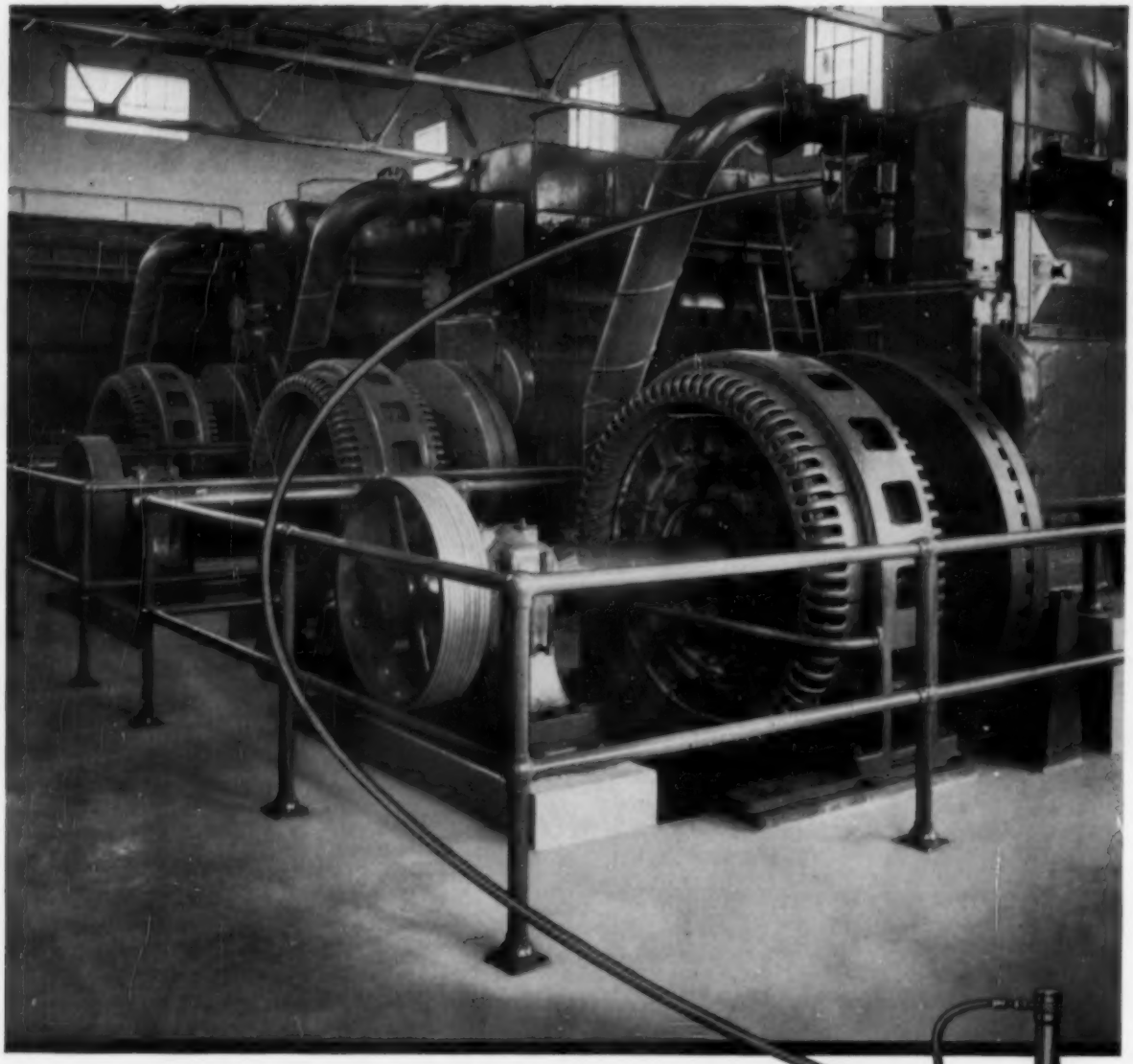

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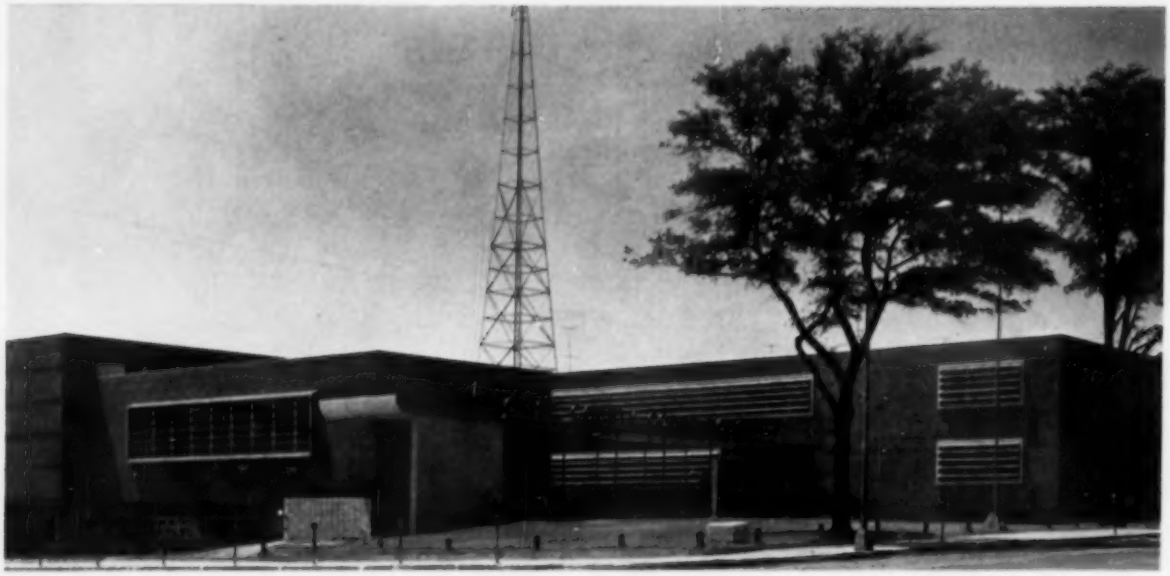
NEWS *for the South and Southwest*



Engineering and management office of the Crisp County Power Commission is located in this building at Cordele, Georgia.

Combined Gas Turbine-Steam Turbine Unit For Crisp County Power Commission — Ga.

The first power plant in the United States to be planned as a combined gas turbine-steam turbine generator unit will be built in Cordele, Georgia, by the **Crisp County Power Commission**, according to **W. Dan Sinclair**, manager and chief engineer of the Commission.

In the new unit, exhaust from a gas turbine will flow into a steam boiler where, in combination with pulverized coal, it will produce steam for a steam turbine.

Mr. Sinclair said that although several other power stations are using gas turbines to improve efficiency of steam turbines, the Crisp County installation will be the first specifically designed and engineered to combine a gas turbine and steam turbine unit. Both the gas and the steam turbine-generators will be built by the General Electric Company.

In the new plant, a 5,000 kw simple-cycle, single-shaft gas turbine will exhaust into a B & W boiler to develop 600 lb of 825 F total temperature steam for a 12,500 kw steam turbine-generator. Thus, the maximum capability of the combined cycle is estimated at 17,500 kw.

Pulverized coal will provide supplementary firing in the boiler to provide additional steam, including necessary superheat when required by the steam turbine, over that generated by the gas turbine to the capacity of the steam turbine, including necessary superheat. The steam boiler will have capacity for the full output of the steam turbine when the gas turbine is not operating. Natural gas will be used as fuel for the gas turbine. The gas turbine exhaust at 840 F will provide the necessary heat to warm up the power boiler without using supplementary fuel.

The new unit, scheduled to be placed in operation in 1958, will increase the Commission's generating capacity to more than 30,000 kw.

More News — Page 89

Evans Rule—South Atlantic

Evans Rule Co. has appointed the **K. Lester Wilson Co.** of Baltimore, Md., as sales representative for **Virginia, West Virginia** and **Western Maryland**, according to D. W. Goldman, Evans vice president in charge of sales.

Evans is the nation's largest manufacturer of flexible steel measuring tapes. Wilson will sell the full line of Evans White-Tapes, including the new Evans "Power-Tape."

A. J. Kroog Company—Ga.

The **A. J. Kroog Company** has recently moved into new and expanded office headquarters at 305 Professional Bldg., 235 East Ponce de Leon Ave., **Decatur, Georgia.**

Serving industrial, power, water and sewage plants in the Southeast, the company has branch offices in **Charlotte** and **Birmingham. W. S. (Steve) Shackelford, Jr.** is now associated with A. J. Kroog in the Decatur, Georgia office.

National Supply—Atlanta

C. Kirk Garrett has been appointed district manager at the Atlanta, Georgia, office of the **Spang-Chalfant Division of The National Supply Company.**

Mr. Garrett joined the Spang-Chalfant Division, a manufacturer of steel pipe and electrical conduit, in 1941 as a sales representative in Chicago. He was transferred to Tulsa in 1946, St. Louis in 1949, and has served at Atlanta since 1953.

"I want a ***dependable*** oscillograph for stand-by monitoring of our station ***and*** system."

"I want an automatic oscillograph ***designed exclusively*** for the power utility field."

RS-9 *Thirty*

The answer for both MANAGEMENT and ENGINEERS...

The Hathaway RS-9 *Thirty* or RS-9 *Fourteen*

LOCATE FAULTS QUICKLY for continuity of service. Combination of different type starting relays monitor for any fault.

LOWER COSTS by simple installation and easily accessible back-panel terminals.

CUT OUTAGES . . . Complete records insured by 2 millisecond-starting initiating mechanism.

MAINTAIN AND ADJUST EASILY through hinged panels leading to optical stage, galvanometer stage, and all internal mechanism.

SAVE TIME with front panel control and accurately calibrated viewing screen.

VALUABLE RECORDS PROTECTED by chart advance mechanism which eliminates foggy records.

ADAPTABLE TO YOUR NEEDS . . . • From 1 to 30 channels • 10 or 12 inch wide chart • Magazine or cartridge loading • Date and time on every record • Widest range of galvanometers • Automatic lamp replacement • Projects only 8 inches from panel

Included in a wide range of accessories are the RAC-2 and RAV-2 precision made shunt resistor units, each with two channels to control current and voltage. Units may be panel-mounted or wherever required for staged testing.

You can benefit from the outstanding performance of these instruments as do cost-conscious utilities throughout the world. Experienced Hathaway engineers can help analyze your needs.

Write for Bulletin 1-20L and 1-21L.

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is guarded by . . .

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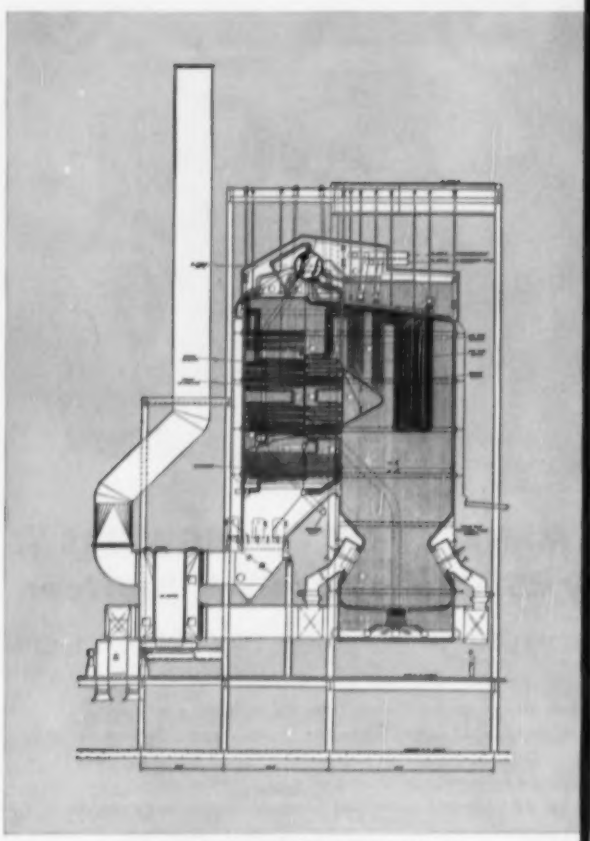
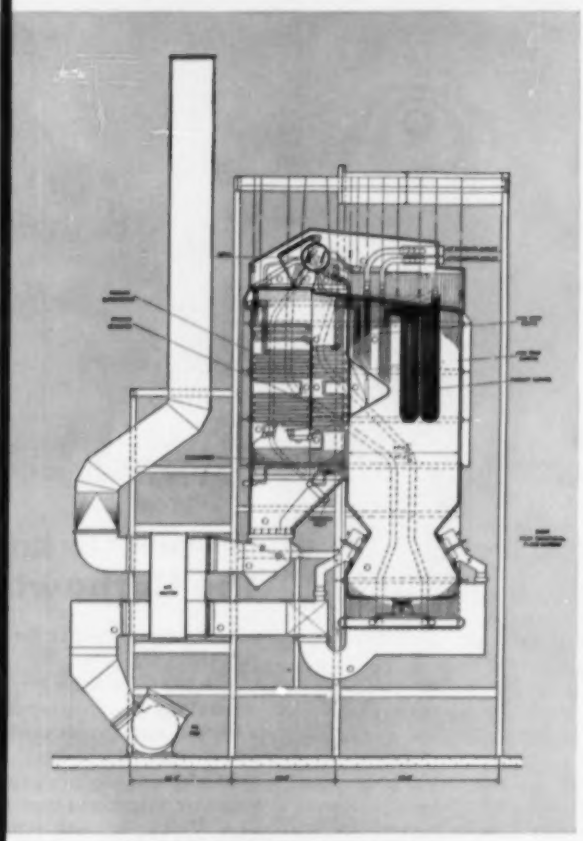
For more information, use Reply Card—Page 17

Solve problem of



Riley Reheat TURBO FURNACE Unit:
For Texas Public Utility
Capacity: 825,000 lbs/hr. Pressure: 1750 psig design
Superheat and reheat temperatures: 1005 F
Fuels: Natural Gas, Oil, Future Coal
12 Riley Directional Flame Burners
Pressurized Turbo Furnace



Riley Reheat TURBO FURNACE Unit:
For Texas Public Utility
Capacity: 1,250,000 lbs/hr. Pressure: 2125 psig
Superheat and reheat temperatures: 1005 F
Fuels: Natural Gas, Oil and Future Lignite
16 Riley Directional Flame Burners
Pressurized Turbo Furnace

OTHER RILEY TURBO FURNACE UNITS INSTALLED OR ON ORDER

Northeast Paper Mill
One 175,000# Unit
Pulverized Coal

Eastern Seaboard
Public Utility
Three 500,000# Units
Fluid Coke, Refinery Gas, Oil, Coal

West Va. Chemicals Co.
One 175,000# Unit
Pulverized Coal, Oil

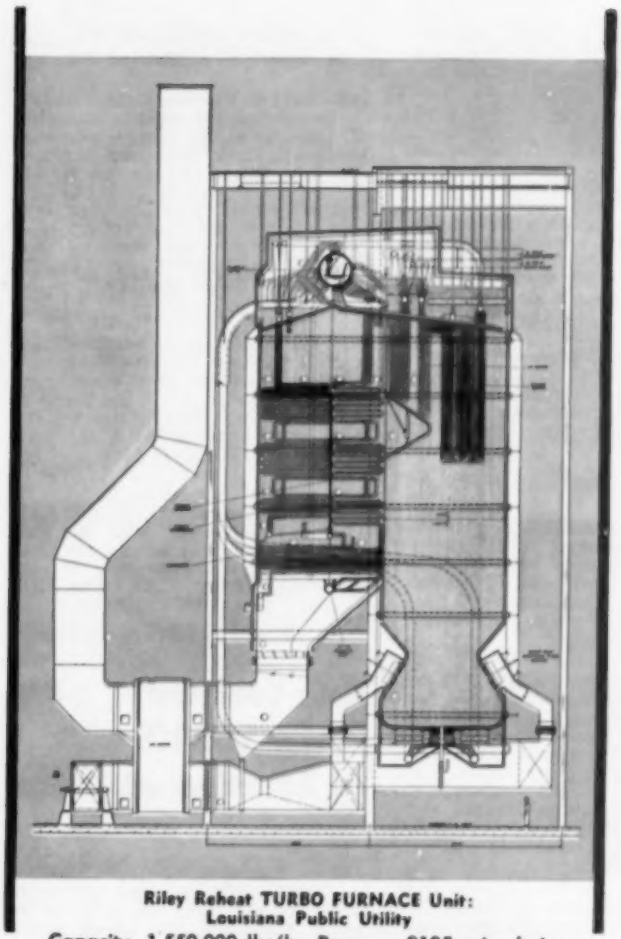
West Va. Chemicals Co.
One 289,000# Unit
Pulverized Coal, Oil

Southern Aluminum Co.
Three 320,000# Units
Gas, Oil, Future Coal

Florida Public Utility
One 600,000# Unit
Reheat — Oil, Future Coal

RILEY DESIGNS, MANUFACTURES AND INSTALLS COMPLETE STEAM GENERATING UNITS AND FUEL BURNING EQUIPMENT FOR PUBLIC UTILITY AND INDUSTRIAL POWER AND HEATING PLANTS

multi-fuel firing



Riley Reheat TURBO FURNACE Unit:
Louisiana Public Utility
Capacity: 1,550,000 lbs/hr. Pressure: 2125 psig design
Superheat and reheat temperatures: 1005 F
Fuels: Natural Gas, Future Oil, Pulverized Coal, Lignite, Delayed Coke, Fluid Coke.
20 Riley Directional Flame Burners
Pressurized Turbo Furnace

THESE three RILEY TURBO FURNACE boilers will solve the fuel selection problem for their public utility owners.

When coal, lignite petroleum coke become more economical to use than oil or gas, these TURBO FURNACE boilers will be ready to burn such fuels. No expensive conversion is needed . . . the addition of pulverizers and coal piping can be accomplished with a minimum of outage time. What's more, when burning low grades of oil and coal, furnaces stay clean; no slag blowers are needed.

The extreme turbulence in the combustion chamber produces a high burnout rate and combustible losses are practically nil.

Investigate the unusual operating characteristics of the RILEY TURBO FURNACE: contact your Riley representative or Riley Stoker Corporation, Worcester, Mass. for detailed information about them.

A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

RILEY
Stoker Corporation
WORCESTER, MASSACHUSETTS

Sales Offices: Worcester, New York, Philadelphia, Buffalo, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Houston, Denver (Englewood), Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.

WHERE TO GET IT *And How to Do It*

-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

4 — Steam Generators — Bulletin AXY-1 describes auxiliary equipment and design features of the Amesteam Generator for sizes 10 through 600 hp and illustrates how this integrated design reduces cost and increases life and reliability. —AMES IRON WORKS, INC.

13 — Power Plant Equipment — 12 page booklet No. 1022-A gives details on combustion and boiler feedwater control, pressure reducing, desuperheating and automatic soot blowing — retractable and rotary. — COPES - VULCAN DIVISION, BLAW-KNOX COMPANY.

16 — Small Boiler Performance — Brochure shows how the packaged Ljungstrom air preheater boosts performance. Boilers are small as 25,000 lb/hr can have advantages of regenerative preheating—saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

45—No. 6 Oil Burner—Low pressure air atomizing burner, described in Bulletin AD-158, is rated at 90 gph. Components include latest type of combustion controls.—CLEAVER-BROOKS COMPANY.

51—Packaged Water Tube Boilers—Complete data and dimensions for boilers ranging from 8,000 to 50,000 lb/hr, firing oil or gas or both, described in 12 p Catalog 111-D.—SUPERIOR COMBUSTION INDUSTRIES, INC.

56—Water Tube Boilers — Booklet — Describes details of stoker — oil or gas or combination gas/oil, 10 to 350 hp to 250 psi; designed for easy conversion to any fuel. — QUEEN CITY ENGINEERING CO.

83—Steam & Hot Water Generators —Booklet describes company's line of fifteen compact models from 18 to 500 hp (15 to 200 psi). Only five connections needed; no special foundation. — CYCLOTHERM DIVISION, NATIONAL-U. S. RADIATOR CORP.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

108—Active Air—Catalog 2046 shows how to put active air to work in buildings and shops. Direct drive exhaust fans, air circulators, and ceiling fans. — EMERSON-ELECTRIC.

110 — Deaerator — Publ. 4651 describes design that eliminates tubular vent condensers without impairing efficient purging of non-condensible gases. Unit handles wide range of operating conditions. — COCHRANE CORPORATION.

112 — "Packaged" Fans — Catalog 515 shows how Clarage V-belt Ready Units economically answer your smaller air handling requirements. 18 sizes, wheel diameters 9¾ to 32½", capacities to 12,000 cfm. Direct connected units also available. —CLARAGE FAN CO.

116—Air & Gas Compressors—Form 3132-A shows complete range of centrifugal and reciprocating units used in process and chemical industries—for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfm. — INGERSOLL-RAND COMPANY.

123 — Slurry Pump — Catalog describes the new SP-90 slurry pump which permits proportion of slurries in the mix tank to remain constant, with pumping rates variable from maximum to 1/5 of maximum.—MANZEL.

128—How to Solve Pumping Problems—Booklet, 36 pages — Explains the functions and characteristics of Rotary gear pumps; sample application problems with charts and curves on pipe friction losses, viscosity conversion tables, materials of construction for various liquids, and additional information pertaining to pump applications.—GEO. D. ROPER CORPORATION.

135—Heat Exchanger—Bulletin 132 shows how sectional Aero unit gives close temperature control, saves labor, power, and water; design improves heat transfer to out-door air by evaporation; 7,000,000 to 18,000,000 Btu/hr capacity range. — NIAGARA BLOWER COMPANY.

158 — Submersible Pumps — 12 p bulletin covers four basic pump types; handy selection chart, units range from 5 to 900 hp and from 30 gpm capacity to 30,000 gpm and above.—BYRON JACKSON PUMPS, INC.

191—Screw Pumps—Standard gear-in-head, high pressure long body gear-in-head, and standard vertical gear-in-head types described in 12 p Bulletin WQ-S205. Includes design features, sectional views and installation photos. — WARREN STEAM PUMP COMPANY, INC.

INSTRUMENTS—METERS CONTROLS—REGULATORS

202—General Purpose Controls—32 p operation and application manual GEA-6372 explains what each product is, shows how product works and tells where devices can be applied. Covers manual, magnetic and reduced-voltage starters; push buttons; relays; limit switches; solenoids; pressure and vacuum, float and plugging & anti-plugging switches. — GENERAL ELECTRIC COMPANY.

207—Automatic Oscillograph—Bulletin describes features of the new RS-9 units which give more channels, faster starting, more types of starting relays, sharper traces, and lower expansion cost.—HATHAWAY INSTRUMENT COMPANY.

218 — Level Alarms — Bulletin D2 shows how you can operate alarms, fuel cut-out, start and stop pumps safely and accurately with Level-arms. Wide variation of control combinations.—THE RELIANCE GAUGE COLUMN COMPANY.

Note Your New Reader SERVICE on Advertisements

224 — Precision Relays — Bulletin MRM 240 describes new high limit and low limit action relays for alarm signalling and on-off operation of electrical loads. — MANNING, MAXWELL & MOORE, INC.

253—Combustion Analyzer — 4 p Specification E65-5 describes the "Heat Prover" which indicates per cent by volume oxygen and combustibles present in exhaust gases from all types of boiler and industrial furnaces. — BAILEY METER COMPANY.

264—Liquid Level Control — 32 p Bulletin F-4 describes the Level-Trol for automatically maintaining liquid level at desired point in a heater, condenser, exchanger or other vessels. — FISHER GOVERNOR COMPANY.

267—Remote Liquid Level Indicator — How clear, brilliant readings from any angle are possible with

this unit is explained in Bulletin WG-1824. Pointer is always visible, even at extreme high and low water levels. Of manometric type with automatic temperature compensation. — YARNALL-WARING COMPANY.

274 — Self-Operated Regulators — Series 655 regulators used on a wide variety of industrial applications to control the pressures of water, steam, oil, gas or other fluids, are described in 4 p Bulletin C-655. Also used as air operated shut-off valves, which are actuated by pneumatic switches, solenoid valves, pilot valves or remote panel loaders. — FISHER GOVERNOR COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

300—Cast Iron Welding—Data sheets describe the new Xyron 2-25 strontium-aluminum bearing electrode for crack-free welding of gray and ductile cast iron, including Meehanite, Ni-Resist, and for joining cast iron to steel. — EUTECTIC WELDING ALLOYS CORP.

304—Backing Rings — Bulletin 56-2 describes rings designed for fast economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in both shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING COMPANY.

318 — Wrought Iron — "ABC's of Wrought Iron"—A concise digest of more detailed technical handbook material on wrought iron—describes resistance to corrosion, fabrication process—where needed—shock and vibration endurance.—A. M. BYERS.

334 — Electric Power Hammer — Drilling, routing, cleaning, caulking, chipping are among many maintenance and construction applications described in Bul. 5199. Drills holes up to 1⅛" in diameter; 2300 blows per minute; weighs only 12 lb, 13 oz. — INGERSOLL-RAND.

336—Retaining Walls—Catalog RW 3555 shows how bin-type walls stabilize slopes and gain valuable ground for buildings, parking areas; all-metal cellular construction; all-bolted assembly means small crews can do the job.—ARMCO DRAINAGE & METAL PRODUCTS, INC.

338—Aluminum Grating — Catalog shows types available, a safe load table, stair treads available in abrasive and serrated nosing. Contains instructions on how to order. Grating especially designed for safe footing in industries where grating is subject to excessive dampness, oil or grease. Both riveted and pressure-locked designs available. — KERRIGAN IRON WORKS, INC.

386—Rigid Frame Buildings—8 page bulletin "Dixisteel Rigid Frame Buildings"—low cost, flexibility of design, durability, and minimum maintenance; also triangular or bow-string truss all-steel roof systems; fabricated for rapid erection. —ATLANTIC STEEL COMPANY.

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467	491	500	502	511	512	527	595	601
604	606	608	614	643	649	666	700	701
702	703	711	718	723	735	764	802	805
811	842	874	909	937	M-17	M-18	M-19	M-20
M-21	M-22	M-23	M-24	M-25	M-26	M-27	M-28	M-29
M-30	M-31							

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PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

401—Underground Pipe Insulation—4 p brochure L-102-F-56 discusses problems of underground pipe insulation and explains how Gilsulates' special properties overcome them. On-the-job photos illustrate ease and speed of application. Thermal coefficients of transmission and other technical data and specifications are given. — AMERICAN GILSONITE COMPANY.

407—Fabricated Piping Data—Complete reference book for piping designers and engineers; high pressure-high temperature installations. — PITTSBURGH PIPING AND EQUIPMENT CO.

409—Lubricated Plug Valves—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. —THE WM. POWELL COMPANY.

430 — Check Valve — Catalog 30A highlights the "tilting disc" check valve for handling fluids or gases under wide range of pressures. —THE CHAPMAN VALVE MFG. CO.

465—Steam-Jacketed Valves—Bulletin E-200—Describes the design, operation and special arrangement of steam jackets for handling viscous materials such as heavy petroleum, coal tar and chemical products, which congeal or harden under operating conditions. Illustrated, with engineering data.—EVERLASTING VALVE CO.

467 — Valve Selecting Guide — Revised edition of Circular 555 (A.I.A. File No. 34) gives tables, technical data and general information on selection of valves, boiler mountings and lubricating devices. —THE LUNKENHEIMER CO.

491—Control Valves—Catalog 1500-B, illustrated — Describes complete line of Domotor, solenoid-operated and handwheel single seat control valves for handling difficult fluids under extremes of temperature and pressure. Offers full, unrestricted flow, positive plug and seat alignment and directional flow flexibility. —THE ANNIN COMPANY.

MAINTENANCE PACKING GASKETS, LUBRICATION

500—Liquid Separator Filter—Catalog describes Fram Space-Saver Units, for removing water from liquid hydrocarbons by filtration. Units engineered for easy installation and maintenance and are designed for a wide variety of applications — up to 69 gpm. — WARNER LEWIS COMPANY.

502—Hazardous Liquid Gasket Material — How type 662 gaskets can stand varying climatic conditions without drying, shrinking, or hardening described in Bulletin AD-146. For use against gasoline, water and oil at temperatures up to 300 F. Has Underwriters' Laboratories, Inc. approval. — THE GARLOCK PACKING COMPANY.

511—Maintenance Ideas—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line. — KANO LABORATORIES.

512—Lubricator Vacuum Type Pumping Unit—If your plant is experiencing difficulty with visibility and excessive maintenance on lubricator sight glasses, the new 82 vacuum pumping unit will offer lower costs. Form 1263 gives principle of operation and advantages.—MANZEL.

527—Wear-Free Packings—File No. DMSP describes complete line of metallic and semi-metallic packings. — DURAMETALLIC CORPORATION.

595—Plant Lubrication — The Lubriplate Service Handbook — Gives valuable information on the subject of lubrication in all its

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334	336	339	386	401	407	409	430	465
467	491	500	502	511	512	527	595	601
604	606	608	614	643	649	666	700	701
702	703	711	718	723	735	764	802	805
811	842	874	909	937	M-17	M-18	M-19	M-20
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forms, intended to be of everyday use to plant superintendents, managers, maintenance engineers and those in charge of plant production and maintenance. — LUBRIPLATE DIVISION, FISKE BROTHERS REFINING CO.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

601 — Fluid Drive — Bul. 9819 describes features of improved Type T Gyrol Fluid Drive for general industrial applications. Applications and advantages noted; rating charts give hp ranges for various engine and electric motor drive speeds. — AMERICAN BLOWER CORPORATION.

604—Motor Units—Catalog 51 describes motor units for accurate performance and longer, lower cost life for operation of valves, floorstands and sluice gates. — CHAPMAN VALVE MANUFACTURING CO.

606—Power-Rotated Jib Crane—Bulletin describes all-electric 360° revolving jib cranes in 6, 7½, 10 and 15 ton capacities which provide power handling for 1936 sq ft of floor space. Design permits fraction-of-an-inch control.—R. G. LETOURNEAU, INC.

608—Conveyor Belt Repairs — Bulletin R-700 and Folder R-4 describe the "Rema" method of making vulcanized repairs without heat. Holes, gouges, rips and tears can be repaired on the job. Curing time delay is eliminated. Belts can be put into service immediately after repair is made.—FLEXIBLE STEEL LACING COMPANY.

614—Vertical Transportation — Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumbwaiters, and modernization and maintenance equipment for use in industrial, utility and service plants. —OTIS ELEVATOR CO.

643—Automatic Monorail Transportation — Bulletin AD-1A, 12 pages—Describes a complete range of automatic dispatch monorail systems for transfer of materials by remote control. — AMERICAN MONORAIL CO.

649—Hydraulic Aerial Ladders — Catalog outlines features of Series 2100 all-hydraulic ladder, which rotates 360 degrees, reaches up to 40 ft in the air and elevates to 75 degrees.—J. H. HOLAN CORPORATION.

666—Electric Power Drives—12 page catalog contains cut-away drawings illustrating various features of variable speed and slow speed gear reduction units, and totally enclosed splash-proof motors. Includes mounting and control information. — STERLING ELECTRIC MOTORS.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700—Water Conditioners—4 p brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. —ANDERSON CHEMICAL COMPANY, INC.

701—Exhausting Corrosive Fumes—Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans.—CLARAGE FAN CO.

Southern Sales Service

NEW DIRECTORY for Plant Engineers

See Page 99

702—Water Conditioning — Bulletin 611A, 20 pages—Gives comprehensive data on methods of conditioning water for boiler, process and general use, featuring zeolite water softeners of "double-check" design. Data on filters, purifiers, zeolites, ion-exchange resins, de-gasitors. — ELGIN SOFTENER CORPORATION.

703—Air Conditioning—Bulletins 112 & 122 describe "controlled humidity" method where cooling and heating functions are made completely separate from adding or taking away moisture. No moisture sensitive instruments needed in flexible & compact design.—NIAGARA BLOWER CO.

711—Refrigeration Condensers—Bulletin RC-2 shows how Vogt condensers step up rate of heat transfer and step down head pressures. Closed type for clean waters; film type where water is hard and forms scale. Units save power and refrigeration cost.—HENRY VOGT MACHINE COMPANY.

718—Zeolite Softeners—20 p catalog 4520 describes the sodium zeolite softening process in detail. Contains data required for proposals, lists factors important in selection of proper zeolite material and in sizing of equipment. Single valve controls all cycles of service and regeneration. — COCHRANE CORPORATION.

723—Dust Collection — Catalog describes mechanical and electrical systems which meet most rigid anti-air-pollution codes; low resistance fly ash collector which combines top efficiency with low draft loss for natural or forced draft installations. — BUELL ENGINEERING COMPANY.

735—Refrigerating Machine—Bulletin 1426 describes the Tonrac single-stage hermetic centrifugal refrigerating machine, which maintains constant chilled-water temperature regardless of load. Single level construction simplifies installation.—AMERICAN BLOWER CORPORATION.

764—Cooling Equipment — Bulletin 80-D describes company's complete line of commercial and industrial equipment—operating principles, design features, etc.—FRICK CO.

ELECTRICAL

802—Small Relays—Simple solenoid design with only one moving part described in Bulletin 700. Silver alloy contacts need no cleaning, filing, or other maintenance. — ALLEN-BRADLEY CO.

805 — Power Factor Correction — 24 page catalog 50B shows how you can cut power costs by installing correction capacitors on motors and other inductive electrical equipment. Greater loads can be handled from existing circuits. Wiring, transformer and switchgear costs can be greatly minimized in new installations.—SPRAGUE ELECTRIC CO.

811—Electric Heat—"100 Ways to Apply Electric Heat" gives a wealth of informative data on the use of electric heat in industry — fast, uniform, dependable, backed by nation-wide engineering service. — EDWIN L. WIEGAND CO.

842 — Circuit Protection — Bulletin FIS describes the maintenance free Fusetron fuses which protect motors, solenoids, coils and transformers against burnout, and which increase production by eliminating needless blows. — BUSSMAN MFG. CO.

874—High-Voltage Cable — Bulletin EB-27 gives full details on performance of Type AB insulation in 15 Industry Specification Tests, including operating temperature. — ANACONDA WIRE & CABLE COMPANY.

OPERATING AIDS SUPPLIES & MISCL.

909—Industrial Skin Cleanser—Folder describes Vi-Lan Clean, a non-alkaline, non-acid, all-purpose antiseptic skin cleanser that prevents dermatitis and other skin conditions. Self-service dispensing units. — DAMERON ENTERPRISES, INC.

937—Steel Measuring Tapes—Complete catalog describes full line of measuring tapes from 6 to 100 ft, including wide blade tape with upright measurements. — EVANS RULE. CO.

(More Items — Page 88)

Eleven lines of WALWORTH Saddle Type Wedge Gate Valves

Bronze-Mounted — All-Iron — Ni-Resist

Outside Screw and Yoke — Non-Rising Stem — Quick Opening

Flanged Ends — Screwed Ends

Walworth saddle-type wedge gate valves are manufactured in eleven different combinations of designs and materials, seven of which are illustrated above.

Saddle type wedge gate valves are easy to take apart and are particularly suitable for lines requiring frequent cleaning. Walworth Saddle-Type Wedge Gate Valves are available in a variety of designs including OS & Y; Inside Screw Rising Stem, and Sliding Stem Quick Opening types—in Bronze-Mounted, All-Iron, and Ni-Resist. All types are designed to permit repacking under pressure in either the open or closed position.

FOR COMPLETE INFORMATION, See your local Walworth Distributor or write on business stationery for illustrated circular.

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60 East 42nd Street, New York 17, New York

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74 TONS *of GILSULATE were poured around 1500-foot steam line.*

ONLY 5 MEN *(unskilled) were needed to do the job: two in the trench and 3 above.*

Western Carolina College Chooses GILSULATE® for New Steam Installation

On its modern campus at Cullowhee, N. C., Western Carolina College recently poured 66 tons of type B and 8 tons of type A GILSULATE on a 1500-foot steam line installation. This brought to more than 1200 tons the volume of GILSULATE used by North Carolina institutions, schools and colleges during 1955—enough to fill 40 railroad cars, or a ditch one yard wide by one yard deep and 10 city blocks long!

The installation consists of a 6" steam and a 2" condensate piping system. During pouring, only 2 men were required in the trench and 3 men above to open the bags and pour.

No other insulation for hot underground pipes can match this low-cost performance—just as no other insulation can match GILSULATE for *permanent* protection of piping systems. No wonder more and more engineers, architects and contractors are *specifying* GILSULATE for their hot underground piping work!

Whatever the type of job you have in mind—airport, school, utility, institution, factory, railroad—it will pay you to investigate the unusual features of this easily-installed, dependable, low-cost system. Use the coupon below or see your local GILSULATE dealer.

FACTS ABOUT GILSULATE

1. *EASY TO USE*—just pour and tamp ...pipe heat does the rest.
2. *FORMS 3 ZONES* of protection against heat loss and all hazards commonly encountered by hot buried pipes.
3. *NEEDS NO HOUSING OR MECHANICAL SHEATHS:* no mixing, special handling or equipment.
4. *ONLY NEEDS NORMAL PIPE SPACING:* for multiple pipe or cramped conditions.
5. *THREE TYPES AVAILABLE:*
   Type A for 220°-300° F. temp. range
   Type B for 300°-385° F. temp. range
   Type C for 385°-520° F. temp. range

UNGRADED DITCH. *Concrete pads were located at 10-foot intervals and 4" transite pipe supports placed on top of them.*

THE TRIPLE-ZONE INSULATION SYSTEM FOR LIFE-TIME PROTECTION OF HOT UNDERGROUND PIPES

GILSULATE®

AMERICAN GILSONITE COMPANY, SALT LAKE CITY 1, UTAH
Affiliate of Barber Oil Corp. & Standard Oil Co. of California

American Gilsonite Co.
134-9 West Broadway, Salt Lake City 1, Utah
or The Agents Building, 3537 Lee Road, Cleveland, O.

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MC

you've got to be good to stay in front

After 69 years' service to Southern industry, Standard Oil lubricants are still *first* in sales. There's only one answer. To stay first your product must be *good*, your services *more than satisfactory*. Standard Oil was first to offer special lubricants for new machinery, and for over half a century these lubricants have been *constantly* improved. So, today, as two generations ago, Standard Oil lubricants still stand as the *finest*. Wherever there are moving parts and friction, in your plant, there are special types of Standard Oil to afford *maximum* protection. Whatever your lubrication requirement may be, there's a Standard Oil lubricant to fit your needs—designed to do your particular job with economy, dependability and efficiency.

STANDARD OIL
LUBRICANTS

The combined facilities for research, testing and engineering behind Standard Oil Lubricants are unequaled.

Standard Oil Company
(KENTUCKY)

Heating and air conditioning, Salt Lake City, Utah

Cold storage piping, Bakersfield, California

Snow melting system, Syracuse, New York

Outdoor ice rink, Hamtramck, Michigan

Water and gas lines, Wyoming Desert

Radiant heating system, Plainview, Texas

. . . and in thousands of other installations, too

SPANG®

QUALITY-CONTROLLED CW STEEL PIPE

GIVES TOP-QUALITY SERVICE

. . . because SPANG Pipe is

- **made from top-quality steel**
- **pre-heated, formed and welded under close control**
- **descaled to provide a smooth finish**
- **sized and straightened to give uniformity**
- **rigidly tested and inspected to assure *top-quality***

A *top-quality* product like SPANG CW saves installation time—saves on construction costs, too. Let SPANG CW Steel Pipe help you make *top-quality* installations. Your local SPANG Distributor will be glad to serve you.

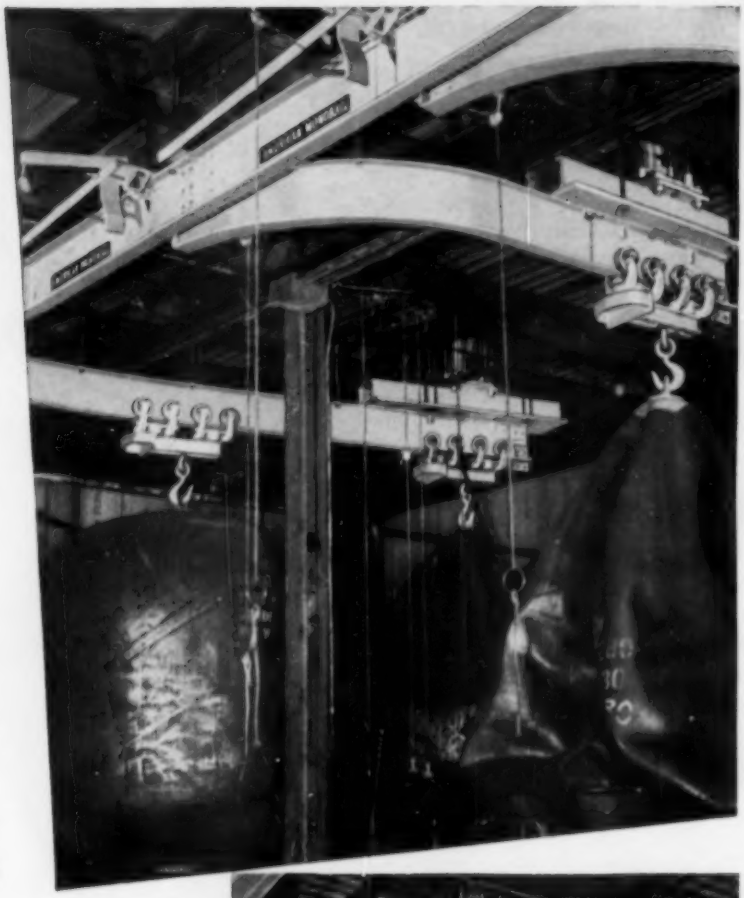
SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

SPANG CW STEEL PIPE

Teamed Engineering for EFFICIENT SEALDBULK HANDLING



U. S. Rubber Company and American MonoRail Engineers teamed up to develop this system.

The Sealdbin containers, a product of U. S. Rubber Co., each hold 11,000 pounds of costly carbon black. This American MonoRail System moves the Sealdbins from flat cars or trucks to special stations for discharge. Empty deflated containers are returned to the supplier for re-use.

Working together this expert team has minimized manual labor, time, and waste.

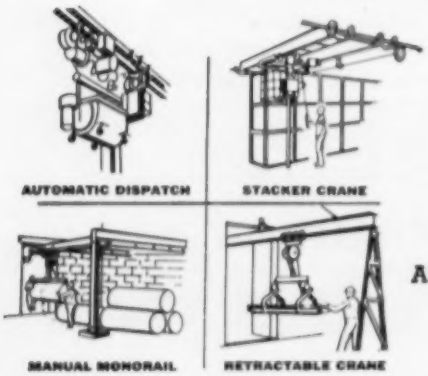
If you have a materials handling problem, call your nearby MonoRail Engineer or write us.

Send for Bulletin C-1.

US RUBBER

Member of Materials Handling Institute and MonoRail Mfrs. Assn.

For Power Driven Conveyors, Use Landahl Chainless Conveyors



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Here's the easy, time-saving way to meet your building needs —for office, warehouse, plant, store or other facilities. Just tell us your space requirements. Your nearby Armco man will be glad to give you the money-saving facts. He will also show you Armco Buildings in use in your area. Look at these advantages.

- **Save preliminary design and engineering time**
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Armco Drainage & Metal Products, Inc.

DIXIE DIVISION
619 Forsyth Bldg. • Atlanta, Georgia

SOUTHWESTERN DIVISION
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Other Offices in Principal Cities

ARMCO

KYGER CREEK . . .

COMPLETED APPROXIMATELY THREE MONTHS AHEAD OF THE ORIGINAL FAST SCHEDULE

Operating Conditions: 2070 psi and 1050° F.

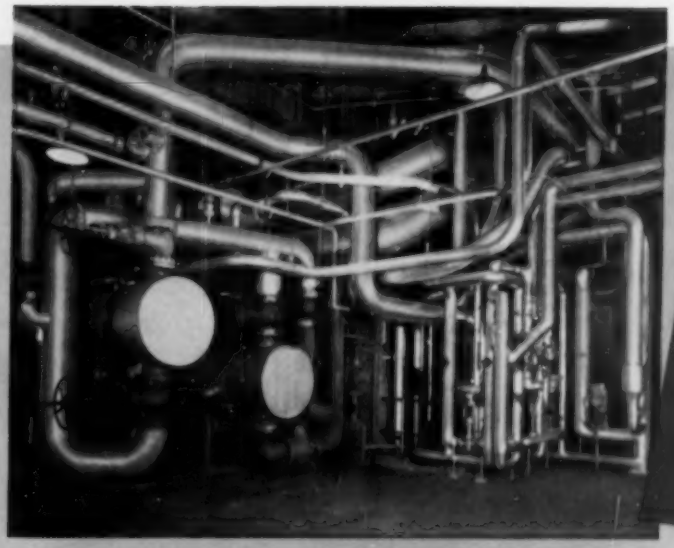
Main steam piping is 13" OD, 2¼" wall thickness, 2¼% Cr—1% Mo.
More than 1,300 high pressure welds were made in the field; inspection by Gamma Ray disclosed that only three of these welds needed minor repair.

Condensate piping.
The piping for Kyger Creek required approximately 3,500 valves larger than 2", 16,000 valves 2" and smaller, and 6,000 instrument valves.

Condensate and bearing cooling water coolers.
Kyger Creek piping used approximately 62,000 carbon steel machine bolts, 5,800 alloy studs, 7,000 carbon steel backing rings and 2,000 alloy backing rings.

MIDWEST . . . PIPING FABRICATORS AND

. largest power plant piping job ever done by one contractor . . .



Heaters and auxiliary steam station.
Of the approximately 11,740 pieces of shop-fabricated piping supplied by Midwest in record time, less than ¼ of 1% (24 pieces) required correction for all causes.

. . . and that contractor was MIDWEST PIPING CO.

With a capacity of 1,075,000 kilowatts, Kyger Creek Plant of the Ohio Valley Electric Corporation† is the largest power plant piping contract (combining fabrication and erection) ever performed by a single contractor. Midwest Piping Company was selected for this critical project because of its long experience in serving the public utilities and because of its outstanding shop facilities and field organization. That this confidence was not misplaced is evidenced by the fact the piping was finished ahead of the original fast schedule.

Unit No. 1 was placed in service during January, 1955 while the fifth unit went on stream less than a year later . . . in December, 1955.

Some idea of the size of this project can be gained from the fact that Midwest supplied approximately 11,740 subassemblies of shop-fabricated piping and at one time had more than 650 men on the erection. To meet the required delivery schedule, fabrication was done at both the St. Louis and Clifton Plants.

Whether for a small job or a giant . . . Midwest can furnish you better piping faster. You will find it to your advantage to call in Midwest whenever you need piping.

OVEC†
THE SPONSOR COMPANIES

Appalachian Electric Power Company*
The Cincinnati Gas & Electric Company
Columbus and Southern Ohio Electric Company
The Dayton Power and Light Company
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Kentucky Utilities Company
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SUBSIDIARY OF *American Gas and Electric Company **The West Penn Electric Company ***Ohio Edison Company

Engineering by American Gas and Electric Service Corp. and Sargent & Lundy.

MIDWEST PIPING COMPANY, INC.
Main Office: 1450 South Second St., St. Louis 4, Mo.
PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

SALES OFFICES: NEW YORK 7—50 CHURCH ST.•LOS ANGELES 33—520 ANDERSON ST.•BOSTON 27—426 FIRST ST.
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MIDWEST PIPING SERVICE IS NATIONWIDE

7576

CONTRACTORS FOR MORE THAN 50 YEARS

JOHN D. LOCKTON

Portrait by Fabian Bachrach

". . General Electric People Have Purchased More Than $513 Million in Savings Bonds

"Since the inception of the Payroll Savings Plan for the systematic purchase of Series 'E' Bonds, May 1941, General Electric people have purchased more than $513,000,000 in Bonds.

"Since October 1948, when the General Electric Company's Savings and Stock Bonus Plan was installed, the Company has contributed, as a bonus on Savings Bond purchases – 962,000 shares of General Electric stock, worth $21,000,000 at the time of contribution and $58,000,000 currently.

"Our Bond-buying employees are truly shareholders in America – building their personal security and aiding the Government in its effort to manage the national debt in a way that is not inflationary.

"As Savings Bonds Chairman of New York State, I have undertaken the important job of encouraging other companies to install the Payroll Savings Plan as a service to their employees. I am proud of the fact that New York State has more than 800,000 systematic savers enrolled in the Payroll Savings Plan."

JOHN D. LOCKTON, *Treasurer*
General Electric Company

For help in installing the Payroll Savings Plan . . . or for assistance in building employee participation in an existing plan, write to: Savings Bonds Division, U. S. Treasury Department, Washington 25, D. C.

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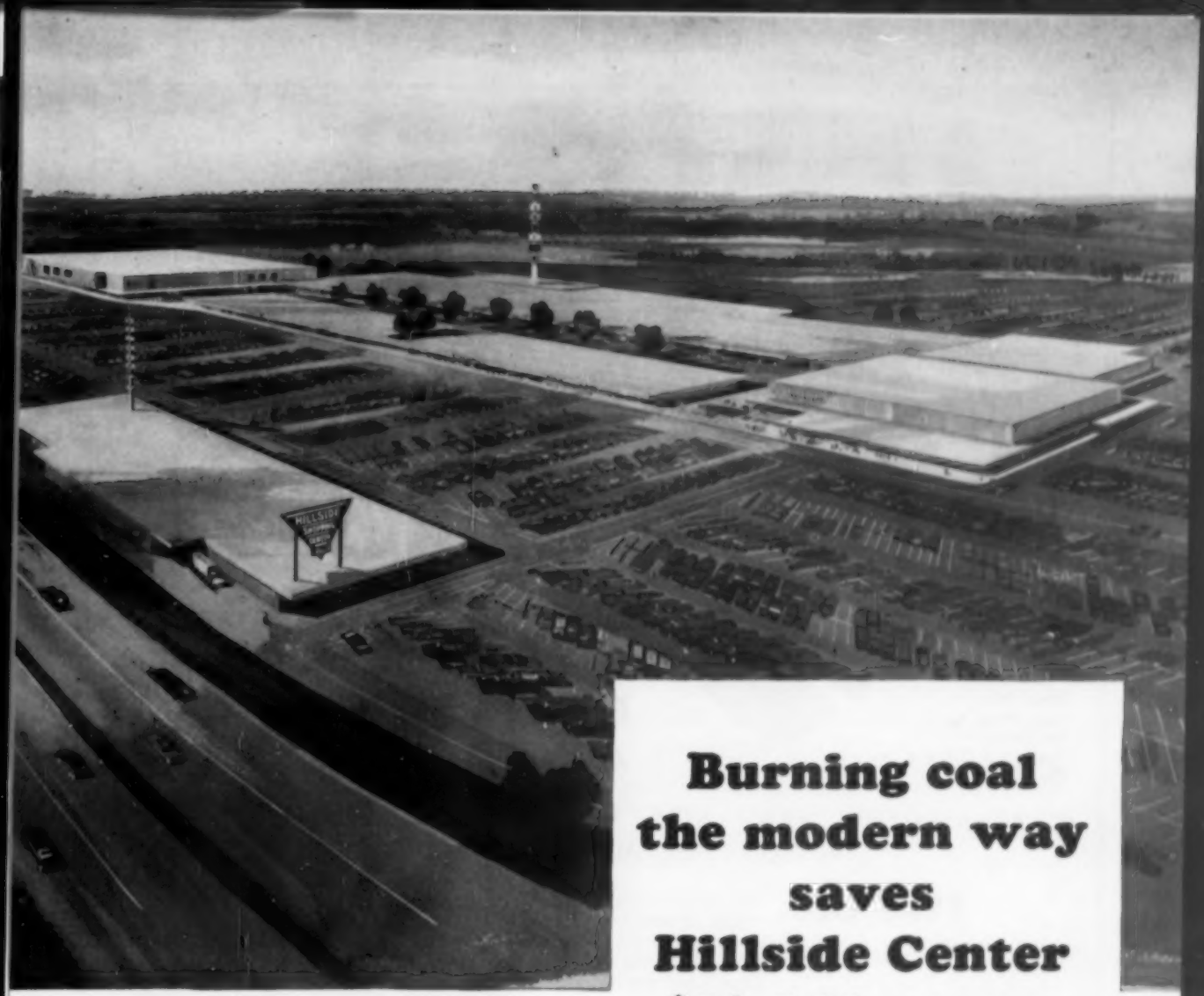
SOUTHERN POWER & INDUSTRY



Burning coal the modern way saves Hillside Center $26,000 a year

The new Hillside Center, Chicago, Ill., is one of the country's largest and most modern shopping centers. Situated on a 59-acre site, it contains over 70 stores and offers parking space for nearly 5,000 cars. When Hillside Center was planned, exhaustive studies were made of prospective fuels . . . and it was decided to burn coal the modern way. For one thing, the initial economy of the mechanical system indicated coal. The cost of a complete coal system—boilers, coal and ash handling equipment, controls, etc.—fell within budget limitations. And, in view of limited space, the compactness of the system was an additional inducement. Finally, boiler room labor costs are at a minimum and actual operation savings with coal, compared to other fuels, is estimated at $26,000 a year.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

BITUMINOUS COAL INSTITUTE
Southern Building • Washington 5, D. C.

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel cost and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum • Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

Patent Nos.
Type C Reg. Pat. No. 2366579
Type CC & CCC Reg. Pat. No. 2764426

ROBVON BACKING RINGS

APPROVED BACKING RINGS FOR WELDED PIPE, VALVES, AND FITTING JOINTS

AVAILABLE IN CARBON STEEL, WROUGHT IRON, CHROME ALLOYS, STAINLESS STEEL, ALUMINUM AND COPPER.

TYPE CCC Designed for quick easy alignment of pipe where the variation in inside diameters is relatively great. Chamfered NUBS allow close tolerance fit-up and CLEAN STRIKE OFF. The ROBVON NUB conforms to the diameter of weld rod. ROBVON rings are beveled to assure non-restricted fluid flow.

TYPE CC Designed to allow quick easy alignment of pipe where the inside diameters are slightly out of round. The welder has the choice of "STRIKING OFF" the NUBS or leaving them intact to be melted into the weld mass of the first root pass.

TYPE C Designed for precise close tolerance fit-up. Type "C" NUBS conform to the diameter of the weld root. The NUBS melt with the metal to give complete penetration and fusion.

ROBVON ALSO MANUFACTURES MACHINED RINGS TO CUSTOMERS SPECIFICATIONS.

ALL FABRICATED SOLID MACHINE RINGS X-RAYED

WRITE FOR FULL INFORMATION

ROBVON
BACKING RING COMPANY

675 GARDEN STREET **ELIZABETH, NEW JERSEY**

Look for this honored Name Plate . . .

STEAM GENERATORS by Vogt

a guide to advanced designs in package unit and custom built steam generating equipment

Vogt steam generating units are available in types and sizes to meet individual plant needs for power, processing or heating.

Package units range from 10,000 to 40,000 pounds of steam per hour while custom built units are obtainable in the larger capacities. Available in bent tube types and straight tube, forged steel sectional header types for solid, liquid or gaseous fuels burned singly or in combination.

Write for Bulletins, Dept. 24A-BS

HENRY VOGT MACHINE CO.
Box 1918, Louisville 1, Kentucky

SALES OFFICES
New York, Chicago, Cleveland, Dallas, Philadelphia
St. Louis, Charleston, W. Va., Cincinnati

One of three 15,000 #/hr. capacity package unit steam generators for a State institution.

Two of three 41,000 #/hr. steam generators installed in Medical Center Steam Plant, Louisville, Ky.

Erecting two 50,000 #/hr. steam generators at Kelly Air Force Base, San Antonio, Texas.

OTHER VOGT PRODUCTS
Drop Forged Steel Valves, Fittings and Flanges in a complete range of sizes • Petroleum Refinery and Chemical Plant Equipment • Steam Generators • Heat Exchangers • Ice Making & Refrigerating Equipment

New Plants — Expansions

South Atantic

$5,000,000 citrus products plant to be erected for **Kraft Foods Corp.** on a 256 acre site in **Lakeland, Fla.** . . . March will see the beginning of **Glenn L. Martin Co.'s** factory building in **Orlando, Fla.** which will be completed in October . . . $4,000,000 expansion underway in **St. Marks, Fla.** for **St. Marks Power Plant** . . . Completion of $20,000,000 brewery for **Joseph Schlitz Brewing Co.** scheduled for 1958 in **Tampa, Fla.** . . . $600,000, 100,000 sq ft plant for **Allied Products Corp.** underway in **St. Petersburg, Fla.**

In three years a 100,000 sq ft plant will be erected on a 13 acre site in **Atlanta, Ga.** for **Lovable Brassiere Co.** . . . **International Latex Corp.** laying plans for construction of a manufacturing plant in **LaGrange, Ga.** which will employ 300 persons upon its completion in March . . . $20,000,000 will be spent by **Mead Corp.** to expand the capacity of its **Rome, Ga.** kraft mill by 240,000 tons of paperboard annually . . . **Perfection Industries Div. of Hupp Corp.** will build a 28,000 sq ft warehouse in **Waynesboro, Ga.**

Plans being effected for construction of laboratory facilities in the Irvin Payne warehouse and for a testing station between **Centreville and Manassas, Md.** for **Melpar, Inc.** . . . **Bethlehem Steel Co.** to continue expansion at **Sparrows Point, Md.** to the cost of $380,000.

$250,000 pickle processing plant underway for **Lutz & Schramm Co.** in **Ayden, N. C.** . . . Multi-million dollar paper plant planned for **Union Bag-Camp Paper Corp.** at **New Bern, N. C.** . . . 65,000 sq ft, $500,000 office and warehouse to be erected by **B. F. Goodrich Co.** at **Thomasboro, N. C.**

Construction underway on the 60,000 sq ft plant for **Bennettsville Mfg. Co.** in **Bennettsville, S. C.** — to cost $1,250,000 . . . **Rocky River Mills,** a wool preparation and yarn spinning plant, to be erected in **Calhoun Falls, S. C.** for **Bigelow-Sanford Carpet Co.** . . . Proposed for **Charleston, S. C.** is an oil refinery for **Gulf Oil Co.** which will be located on 3,000 acre site near the Bushy Park industrial water project.

100,000 sq ft plant addition underway for **Sperry Piedmont Div. of Sperry-Rand Corp.** at **Charlottesville, Va.** which will more than double the plant's size . . . Underway in **Danville, Va.** is the $500,000 **Southern Lightweight Aggregate Corp.** plant which will manufacture Solite, a building material . . . $250,000 additions for buildings and equipment underway for **Brunswick-Balke-Collender Co.'s** plant in **Marion, Va.**

$58,000,000 power generation unit to be added to the **Philip Sporn Plant** in **Mason County, W. Va.** by **Appalachian Electric Power Co.** . . . Construction underway in **Willow Island, W. Va.** on the new aniline plant.

East South Central

32,000 sq ft poultry dressing plant underway for **Cotton Producers Association** in **Boaz, Ala.** which will cost $600,000 . . . **Alabama Poultry Enterprises, Inc.** planning a $500,000 building in **Cullman, Ala.** . . .

50,000 sq ft, $500,000 building underway in **Florence, Ala.** for **Tri-Cities Linen Service** . . . Plans being laid by **Reichhold Chemical, Inc.** for a plant in **Tuscaloosa, Ala.** which will produce 35,000,000 lb of formaldehyde annually.

$250,000 woodworking plant underway in **Bowling Green, Ky.** for **L. L. Strausheim** . . . **Post-Glover Electric Co.** constructing $300,000 plant in **Erlanger, Ky.**

Plans being laid for expansion of **D & S Shirt Co.** in **Corinth, Miss.** . . . **Dixie Aluminum Co.** erecting $308,291 plant in **Hattiesburg, Miss.** . . . $100,000 plant work center underway in **Jackson, Miss.** for **Southern Bell Telephone Co.** . . . **J. J. Daily Trailer & Body Co.** moving from Kansas City to an 18,000 sq ft factory being erected on a 3.4 acre site in **Moberly, Miss.** . . . $2,000,000 phosphate fertilizer plant to get underway in April for **Coastal Chemical Corp.** in **Pascagoula, Miss.** . . . Plans being effected for the construction of an $8,000,000 plant for **H. K. Porter Co., Inc.** in **Pascagoula, Miss.** for production of magnesia and basic refractory products . . . **Philadelphia, Miss.** is the site of the $200,000 expansion of **Wells-Lamont Glove Factory** . . . **Monroe Trouser Mfg. Co.** constructing an annex in **Smithville, Miss.** which will more than double the size of its present factory . . . $100,000 refrigerated warehouse to house the meat and packing house products operations of **Merchants Co.** in **Vicksburg, Miss.**

$200,000 expansion program underway in **Chattanooga, Tenn.** for **Chattanooga Medicine Co.** . . . July completion is anticipated for **Chattanooga, Tenn.'s** $300,000 research and pilot plant building for **Heavy Minerals Co.** . . . Plans underway for a plant expansion which will double the office plant and provide additional ore and metal storage spaces for **Electromanganese Div. of Foote Mineral Co.** in **Knoxville, Tenn.** at a cost of $250,000.

West South Central

$5,000,000 construction program underway for **Crossett Paper Mills** in **Crossett, Ark.** . . . **City Water & Light Plant** in **Jonesboro, Ark.** undergoing $2,000,000 expansion program . . . Plans being effected for establishment

(*Continued on Page* 106)

These highlights briefed from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, a monthly publication issued exclusively to SPI advertisers and their representatives through the South and Southwest.

UNIFORM

in QUALITY and ECONOMY

Time is the best test of any product's worth. That's why we're so sure that *Fuel Satisfaction* is your best coal buy.

This superior all-purpose Bituminous Coal, which is mined along the Norfolk and Western, has been in use for more than 70 years. It has proved its worth to generations of industries who have learned they can depend upon Fuel Satisfaction for uniform quality and economy on any job.

These satisfied customers also know that it is false economy to buy any coal that's less than best for the job. This is why, through the years, they continue to use Fuel Satisfaction — the coal that consistently results in greater operating efficiency and economy.

Whether you use coal for heat, power or special purpose, there's a type of Fuel Satisfaction which will do your job better. Contact our coal specialists for purchasing and utilization assistance. There's no obligation.

Norfolk and Western RAILWAY

CARRIER OF FUEL SATISFACTION

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Roanoke, Virginia

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Commerce Building
Telephone Liberty 2-2229
Boston 10, Massachusetts

CHICAGO
Room 604,
208 South LaSalle Street
Telephone RAndolph 6-4634
Chicago 4, Illinois

CINCINNATI
913 Dixie Terminal Building
Telephone DUnbar 1-1325
Cincinnati 2, Ohio

CLEVELAND
1819 Union Commerce Building
Telephone MAin 1-7960
Cleveland 14, Ohio

DETROIT
1907 Book Building
Telephone
WOodward 1-2340 or 1-2341
Detroit 26, Michigan

ST. LOUIS
2059 Railway Exchange Building
Telephone MAin 1-1180
St. Louis 1, Missouri

WINSTON-SALEM
1105 Reynolds Building
Telephone 7116
Winston-Salem 1, North Carolina

SOLID WHEEL

spells non-stop turbine performance

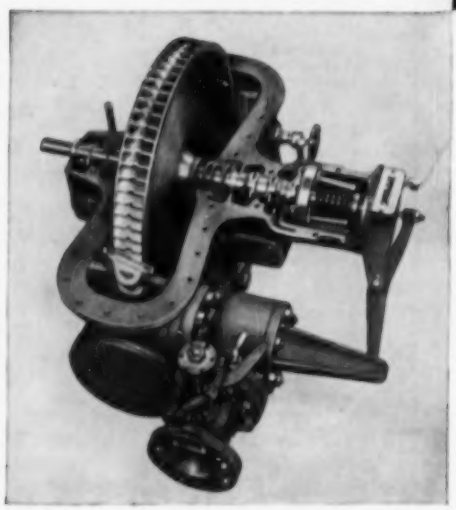
It's easy to see why Terry solid-wheel turbines have been setting non-stop records. They're built for long periods of continuous service.

The rotor, for example, is a single forging of special composition steel, in which a series of semi-circular buckets is milled. There are no separate parts to loosen or work out.

What's more, the blades can't foul. There is a one-inch clearance on either side of the wheel and the blades are double rim protected. There is no need for close axial blade clearance, because the steam enters the buckets at right angles to the shaft.

You, too, can profit from Terry solid-wheel stamina. Bulletin S-116 gives full details. Send for a copy today.

THE TERRY STEAM TURBINE CO.
Terry Square, Hartford 1, Conn.



Action of steam in a Terry solid-wheel turbine. The steam issues from an expanding nozzle at high velocity and enters the side of the wheel bucket where its direction is reversed 180°. As this single reversal uses but a portion of the available energy, the steam is caught in a stationary reversing chamber and returned again to the wheel. This process is repeated several times until practically all of the useful energy has been utilized.

TT-1205

TERRY

FIVE STEPS TO 493,000 KILOWATTS

Units 1 and 2 of Potomac River Station are each of 92,000 kilowatts capability. Units 3, 4 and 5 are of 101,000 kilowatts capability each.

● The initial installation of Potomac Electric Power Company's Potomac River Steam Station serving the District of Columbia and surrounding territory was completed in 1949.

- A second unit was installed in 1950.
- The third unit was installed in 1954.
- Unit #4 went on the line in 1956.
- And a fifth unit is scheduled for completion in 1957.
- Total capability of the five units will be 493,000 kilowatts.

The design and construction of the entire station was by Stone & Webster Engineering Corporation.

●

If you have a problem of design or construction, our broad experience in these and related fields may help you solve it. Write or call us for complete information on our services.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY of STONE & WEBSTER, INC.

New York Boston Chicago Pittsburgh Houston Los Angeles San Francisco Seattle Toronto

Specify **JEFFREY** when you replace

CHAINS
SPROCKETS
PULLEYS
BUCKETS
IDLERS
SPIRAL FLIGHTS

YOUR Jeffrey distributor can supply the units you need for replacing worn parts and modernizing old equipment. Your materials-handling and power-transmission machinery will give more efficient, economical operation when you use these time-tested, dependable products.

Jeffrey replacement parts have the same sound design as those used on original equipment. All are designed for maximum service. Materials and workmanship are the finest. Jeffrey District Offices and Distributors are located in all principal cities. The Jeffrey Manufacturing Co., Columbus 16, Ohio.

JEFFREY

CONVEYING · PROCESSING · MINING EQUIPMENT · TRANSMISSION MACHINERY · CONTRACT MANUFACTURING

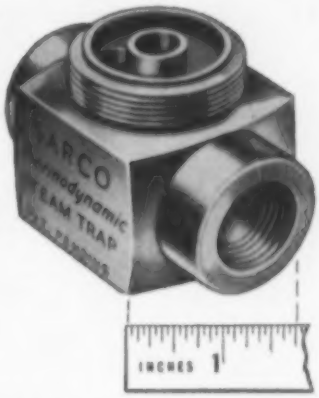
Now — A Revolutionary NEW Steam Trap!

What could be simpler?

1. A CAP

2. A DISC

3. A BODY



That's all!

Practically Eliminates Maintenance!

Look at this revolutionary new thermodynamic steam trap. Could it possibly be simpler? Look for the valve closing mechanism—there isn't any! The kinetic energy of steam closes the valve and *only* the TD uses this new operating principle.

Only 3 parts ... cap, disc and body ... machined from stainless steel bar stock ... all extremely simple, rugged, durable. Only one moving part ... a hardened SOLID stainless steel disc ... practically wear-proof.

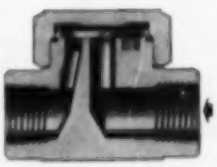
Just imagine how much time and expense this new TD steam trap can save you by greatly reducing and simplifying trap maintenance and inventory!

SOME OF MANY OTHER ADVANTAGES:

1. Use the same trap for 10-600 psi ... for light or heavy loads ... without seat or valve change or other adjustments.
2. Closes tight on no load — no steam waste.
3. Operates against back pressures up to 50% of inlet pressure.
4. Not affected by superheat, water-hammer, corrosive condensate.
5. Only one spare part—solid stainless steel disc.

TROUBLE-FREE DESIGN

No valve-closing mechanism to wear or stick—the kinetic energy of steam closes the valve. No critical clearances to choke. No gaskets to leak. Only one moving part—a SOLID stainless steel disc.



Ask for a 60 day trial installation of Sarco TD trap and strainer ... write for bulletin 257. Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.

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That's why Sarco can give impartial advice on proper steam trap selection.

Thermodynamic Steam Traps

Thermostatic Steam Traps

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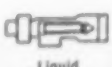
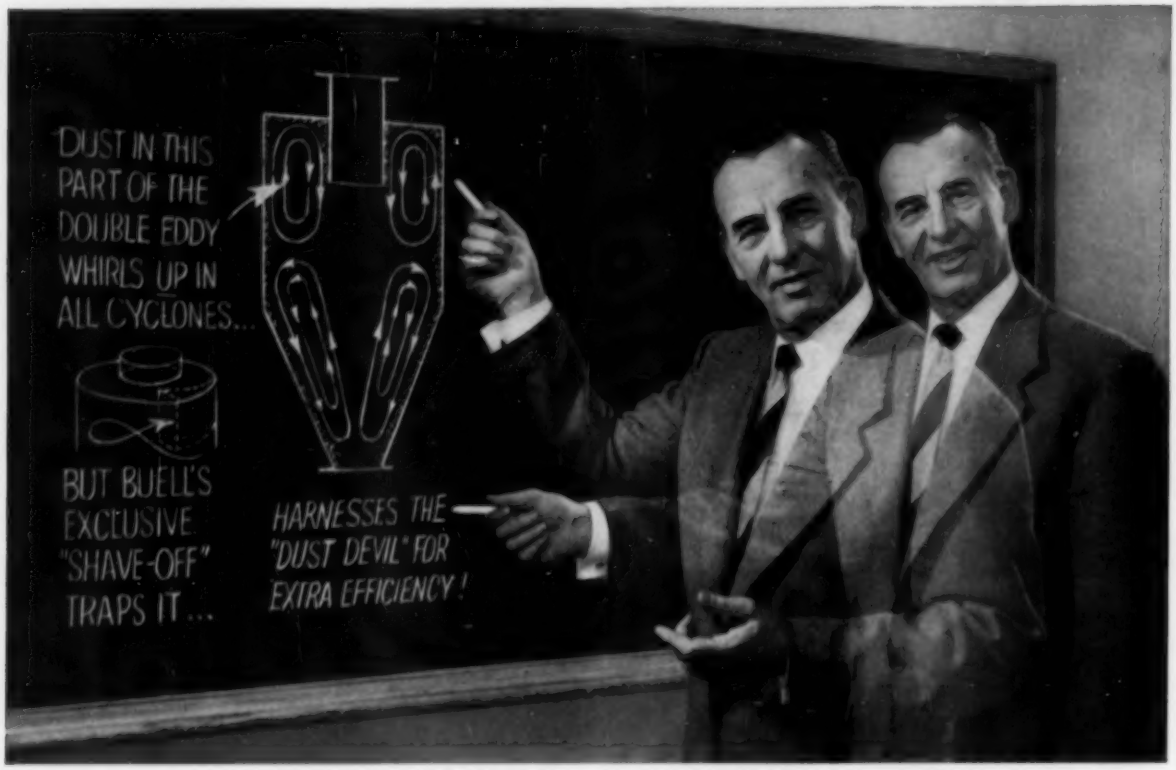
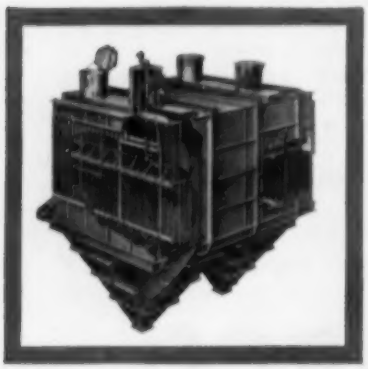

Liquid Expansion Steam Traps

Camlift Bucket Steam Traps

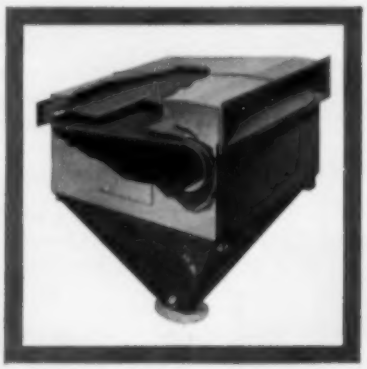
Mastering the double-eddy dust devil leads to extra dust collection efficiency!


DUST IN THIS PART OF THE DOUBLE EDDY WHIRLS UP IN ALL CYCLONES...
BUT BUELL'S EXCLUSIVE "SHAVE-OFF" TRAPS IT...
HARNESSES THE "DUST DEVIL" FOR EXTRA EFFICIENCY!

Other design features which increase efficiency include large, clog-proof diameter, proper proportioning for maximum dust separation, extra-heavy-gauge, wear-resistant construction . . . features which shave dust collection costs to the minimum!



Buell SF Electric Precipitator also delivers *extra dust collection efficiency*, due to unique Spiralectrodes and Continuous Cycle Rapping.

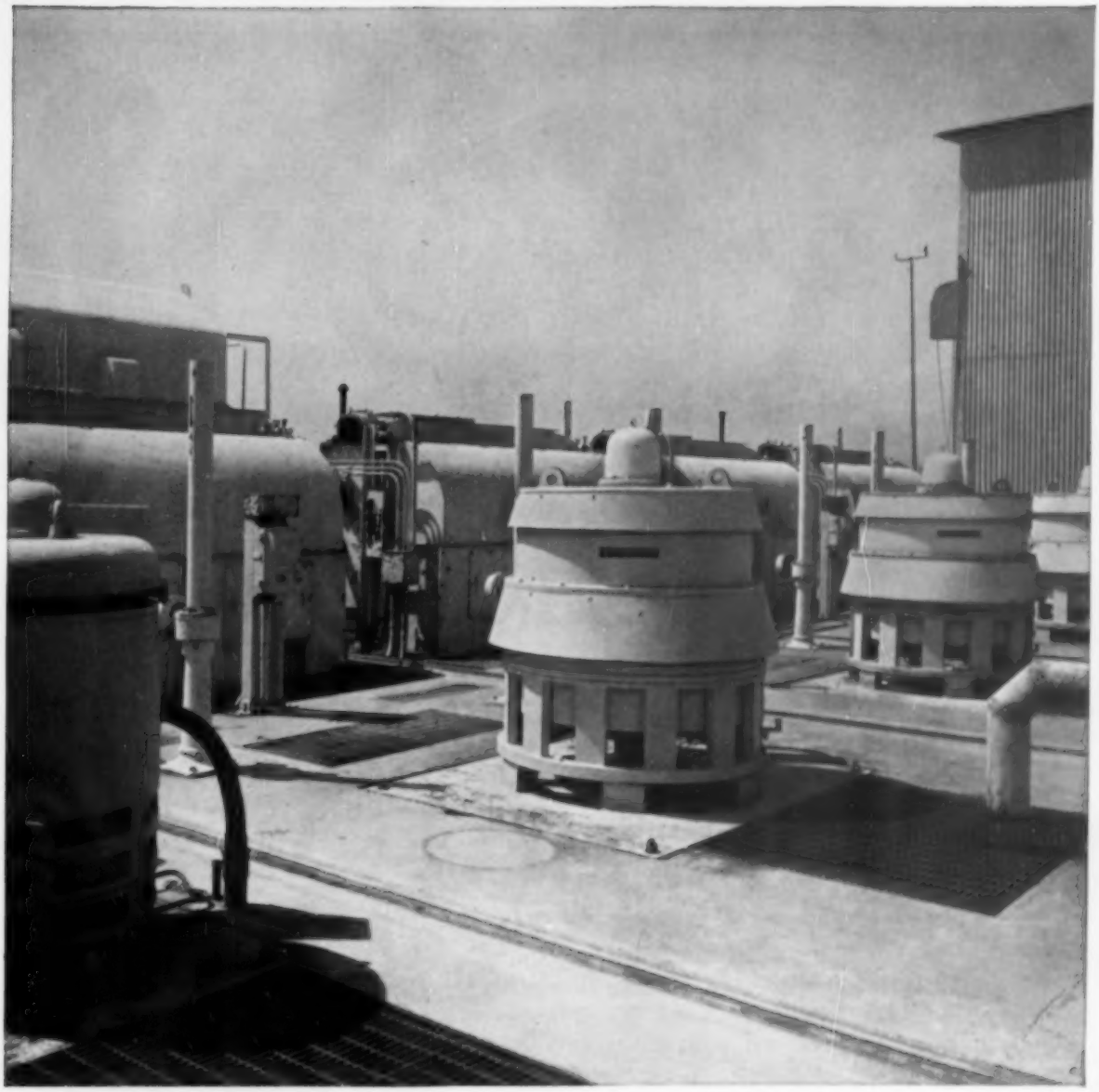


Buell Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for either natural or mechanical draft installations.

For more specific data about Buell's *extra efficiency*, write Dept. 80-B, Buell Engineering Company, 70 Pine St., New York 5, N. Y.

buell®

MECHANICAL ELECTRICAL *Experts at delivering Extra Efficiency in* **DUST COLLECTION SYSTEMS**



Four Fairbanks-Morse low-lift propeller pumps at Fairless

Delaware Borrow

Every day the Fairless Works takes 230 million gallons of water from the Delaware River, uses it in the production of iron and steel, and after treatment returns it to the river. The "big borrow" is started in a plant pumping station equipped with ten Fairbanks-Morse propeller and turbine pumps in efficiently chosen sizes up to 48 inches.

There are pumps in the Fairbanks-Morse line to move any magnitude of industrial water supply at any appropriate pressure, and other pumps to meet ordinary or unusual problems of industrial wastes treatment and disposal. A Fairbanks-Morse hydraulics engineer will be happy to work with your engineers or consultants in specifying the right pump for your specific job. Fairbanks, Morse & Co., Dept. SPI-2, 600 South Michigan Avenue, Chicago 5, Illinois.

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Quick as a cat... Quiet as a mouse

CHAPMAN
Tilting Disc Check Valve

There, in a nutshell, is the story of a Chapman Tilting Disc Check Valve . . . quick as a cat, quiet as a mouse. It's designed that way. It's built that way . . . for fast, sure, quiet action. Or, in other words, it's yours for best performance at lowest long-range operating costs.

With a Chapman Tilting Disc Check Valve, there's no noise, no vibration, no fluttering. There's no banging or slamming with damage to system or valve. There's no scraping or wearing of disc and seat. Your head loss or flow resistance is kept at a minimum.

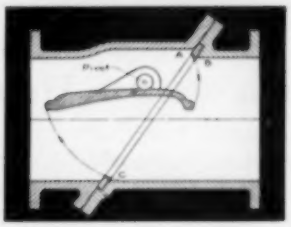
To put it briefly, with a Chapman Tilting Disc Check Valve, there's little or no maintenance even under severe operating conditions.

For Chapman Tilting Disc Check Valves in iron and steel . . . valves for handling fluids or gases under a wide range of pressures . . . valves for replacement or new piping systems . . . just check our Catalog 30-A. It's yours for the asking. Send for it now.

The CHAPMAN Valve Mfg. Company
INDIAN ORCHARD, MASSACHUSETTS

Never a Flutter, Never a Slam!

Designed and Built for Quiet Efficient Operation



In open position, specially designed "airfoil" disc balances perfectly. No vibration. No flutter. When flow subsides, disc drops quickly and quietly to a tight closed position. No jarring. No slamming. No damage to system or valve. Note enlarged area around disc to insure low flow resistance.

TIMELY COMMENTS

Engineers Must LEARN to LIVE

LET'S ADMIT IT! We engineers are frequently prejudiced, narrow-minded and bigoted.—With that load off our chest, so early in 1957, we can open our eyes (and minds) to some of the things we have got to learn and accept if we are to keep-up and keep growing.

Remember when we didn't like fabric belts, electric welding, and "doped" lubricants?

Like it or not materials with real merit force their way to the front. But the going is hard, and that is as it should be because they nearly always require extensive research and field testing before they can even compete on an equal basis with their true and tried predecessors.

PLASTICS particularly have had hard going. In the early stages they were not very good and we are particularly prone to remember the cracked, scarred and discolored items of houseware that resulted from our early purchases.

Not only have newer and better plastics been developed, but we have learned some things about each type that enable us to choose more wisely.

And the ability and reputation of venders has improved to the point that engineers can accept recommendations of industrial plastics with about the same confidence as data from reputable manufacturers of older and better known products.

THE SAME IS TRUE of the newer alloy metals, protective coatings and many other items that the plant engineer must now regularly buy, apply and observe. He adds his own judgment to manufacturer's claims. And then if time will permit he buys sparingly and tests exhaustively, until the newer lines find their proper place in the scheme of things he has to handle.

Sometimes the product is so good, acceptance comes quickly—like electric welding. This "tool we couldn't get along without" was well on its way toward its enormous success before the present adequate testing procedures were developed.

PLASTICS also will frequently be bought more on faith than science, because the need to solve certain problems is so great.

Resistance to corrosion will be the biggest element in their favor. Already plastic pipe and valves "have it made." They are not perfect, but they are good. They are not a panacea, but they do relieve many of the intestinal ailments of industrial operation.

Now plastics are moving into fields where mechanical strength and resistance to vibration must be accomplished if their resistance to chemical action is to be a real asset.

Here's a product announcement, on the desk just today—a new 40 in. diameter corrosion resistant PVC centrifugal blower, good for 15,000 cfm. And here's a new catalog—"Color-Plast," gasket and shim stock, color-coded for instant selection of thickness you want.

Leaving plastics for this time, we turn up another product announcement: ". . . a pure blend of low molecular weight polymers of chlorotrifluorethylene containing no silica, soap, nor other non-halogen thickeners." That's a grease recommended for certain very specific applications.

In all the above we haven't said a word about "static-switching," and we haven't even mentioned "automation" which reached peak usage in engineering language only a few years ago.

We pity the plant engineer who hasn't developed pleasure and facility in reading, because many new products will be in his plant and "asking questions" before he can learn about them from any source other than current technical literature.

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IN FERROUS AND NON-FERROUS METALS

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- **EXTRA STRONG** – reinforced, designed with maximum safety factor.
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INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

Big Expansion Programs Continue

Industrial Construction . . .

INDUSTRIAL construction will continue at present high levels in 1957, according to a recent forecast by William Collins, president, **Walter Kidde Constructors, Inc.**, engineers and builders of New York and Houston, but he warned against expecting a repetition of the sharp increase which promises to push '56 volume almost 100% above 1955 figures.

Mr. Collins pointed out that 1956 industrial construction, which may go over the $5 billion mark for the first time in history, reflected a concentrated desire for expansion, particularly on the part of the steel and process industries. The growing backlog of industrial expansion and modernization projects planned for 1957 — together with the influence of corporate mergers and increasing corporate research programs — appears sufficient to maintain industrial construction at or slightly above its present record level but does not promise the impetus for another large-scale increase.

The Kidde president foresaw little adverse effect on 1957 industrial construction from the increased cost of money.

"When new plants are necessary, **money costs are seldom a factor.**" Mr. Collins said. He pointed out that the cost of money is negligible compared to the loss involved in operating an inefficient plant or in foregoing necessary research and control facilities in a competitive market.

However, **current credit restrictions** were seen as possible stumbling blocks, particularly for smaller companies.

"The situation favors large corporations in that they can avail themselves of capital funds through lending institutions more readily than can smaller corporations."

Although it is expected that building costs will increase moderately in 1957, the pressure on industry to **modernize their plant and facilities** to keep pace with technological competition will make such increases an insignificant factor in decisions to expand and modernize.

The search for **new and improved processes**, as evidenced by continuing high levels of construction of research laboratories and process and quality control facilities, is particularly significant in terms of a long-range industrial forecast. "As new and improved processes continue to result from research and development programs, new plants will be required to house them.

The **mergers** of small, old line, family-held companies with larger corporations interested in diversification is still a major factor in new plant construction and plant modernization. Small companies, previously starved for capital, are now able to modernize and expand.

"Equally important from the long-range view, it is important to realize that construction lags behind mergers by a period of two to three years, due to the time required to correct inadequacies discovered in the new organization," Mr. Collins said. "Thus the mergers which are taking place this year will not have their full effect upon construction volume until 1959."

Electric Utility Construction . . .

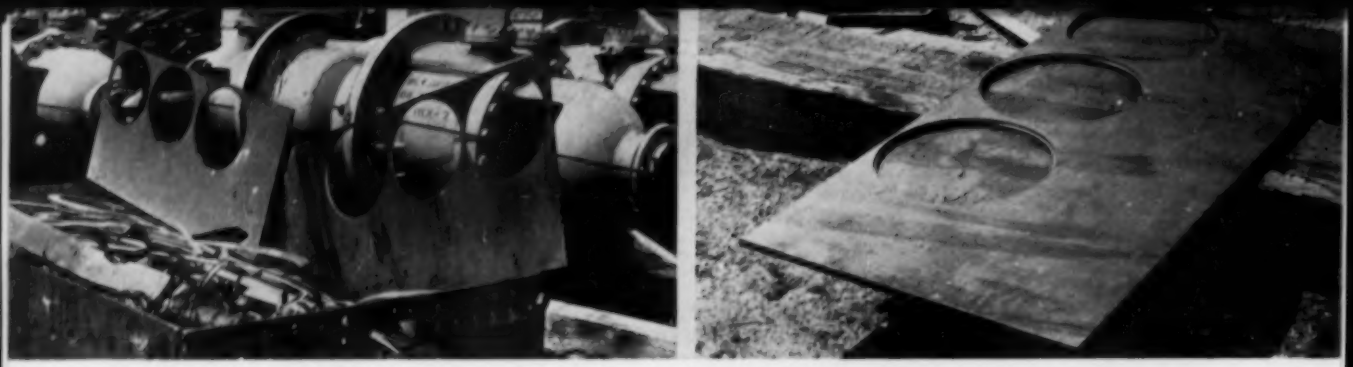
BEGINNING with 1956 the second decade of the biggest expansion program in the history of the U. S. electric power industry starts off with close to 50 million kw of additional generating capability already on order, under negotiation or installed, according to the latest Power Survey of the **Edison Electric Institute.**

This is about equal to the total generating capability of all electric generating plants in 1946. Scheduled additions for the years 1957, 1958 and 1959 alone total 35 million kw, or more than half of all installations in the past decade.

Orders generally are placed two to three years in advance of installation. While orders for 1959 are not yet complete, orders or negotiations for some 7½ million kw for 1960 and beyond are already on the books. Atomic power projects represent about one million kw of the 50 million total presently on order. The present Power Survey is the 20th in a semi-annual series of reports started in 1947 by the Institute's Electric Power Survey Committee.

Total generating capability of U. S. electric

(Continued on page 68)



Carelessness in cutting two brass plates cost $122.00. All six discs could have been cut from one plate.

Dollars Have Wings

Waste of materials is a fault of even the best workmen

Loss to the scrap pile can throw your plant in the red

CAUSES of material waste in industrial plants are many and not always easy to stop. Carelessness is of course a prime cause, but in many cases the most conscientious and productive workers are most wasteful.

A strong desire to get going on a maintenance job and get it done can easily lead to material waste. And a desire to attain high output (particularly on piece work) can do the same.

The workman and his foreman are very conscious of labor waste, because it is entirely within their hands and they know all about it. Materials, however, are bought by another department, delivered through a store room and prices seldom show on the records kept by the workmen on the job. If they knew the exact cost of materials they use and waste, the importance of economy would be obvious. Also, salvage and return of materials to stock are handled by another group and the workmen are frequently wrong if they think unused materials are always safely returned to storage for future use.

All of these departments have to work closely together if maximum material economy is to be had. Therefore they should under-

Suppose you paid the bill last year for these items; would your use (or waste) of them have changed? Figures show actual one year expenditures of Newport News Shipbuilding and Drydock Company.

Improper loading of this ladder and trestles cost $31.00.

stand each other's procedures and problems.

Whenever too much material is delivered to the work spot, there is always danger that unused material will be damaged or not properly returned to stores.

Each foreman should consider himself a temporary storekeeper on the job and make sure that packages are not broken before the supplies are needed, and that materials are placed in a safe location so they will not be damaged by trampling, water and dirt.

Most of the photographs and illustrations on these pages were furnished by Newport News Shipbuilding & Drydocks Company of Newport News, Virginia. They were used in a continuing fight against waste that is being sparked by W. E. Blewett, Jr., president of that company.

Kicking off the material savings campaign, Mr. Blewett said: "With the rise in the cost of materials and the large volumn of materials used, it is becoming more and more important that they be used economically and waste reduced. Our labor is geared to our incentive plan which does not consider material cost, with the result that many times expensive materials of far more value than the labor expended upon them, are wasted or damaged in order to produce a small savings in piecework labor.

"Savings that can be made in our material cost will reflect directly on our competitive position in industry."

Above—This unimposing little group of wasted materials uncovered on the scrap pile has a value of $25.00.

Upper Right—This pile of insulating material was found still at location a year after the job was completed.

Right—This reusable stage pole that cost $20.00 was found on the scrap pile waiting to be burned.

Right—These strongbacks and stage brackets were salvaged. Loss of $65.00 was prevented.

Below Right—These oak blocks found on the scrap pile represent a loss of $135.00. 188 pieces were ordered, and 21 were not used.

Lower Right—Scrap loss has been reduced at Pangborn Corporation, Hagerstown, Md. by display panels which demonstrate the cost of materials regularly used by workmen.

A good way to gain active support for a materials savings plan is to keep employees informed on the value of items they use. Then, it can be pointed out how much a modest percentage savings will mean to the company that employs them. In many instances, a 10% savings on materials can mean the difference between profit and loss on an item being manufactured.

The well known high cost of maintenance is emphasized over and over, but how does anyone follow up to evaluate and stop loss to the scrap pile?

A good method of keeping the need for material savings ever

(*Continued on Page* 65)

Send your best procedures for reduction of materials waste to:

The Editors,
Southern Power & Industry, 806 Peachtree St., N.E., Atlanta 8, Georgia.

The new Johns-Manville plant at Savannah, Georgia . . .

Highlights . . . PLANT SERVICES

PRODUCTION started late in November in the new multi-million dollar plant of Johns-Manville at Savannah, Georgia. Asphalt shingles and roll roofing are the products being made in three main buildings that provide more than 100,000 sq ft of work space.

These buildings are single story car-door height with rigid frame trusses. Roofs are corrugated Transite with 7% translucent corrugated sheets for lighting. Walls are corrugated Transite with a translucent band of one sheet in length. There are continuous ventilators on all ridges.

Air, Steam & Water

Compressed air is supplied by a 12 x 11 ft Gardner-Denver compressor of 75 hp at 100 psi and 425 cfm through an aftercooler for dewatering. Distribution is through a 4 in. main header with zone valves for servicing of drip legs at strategic points. There is ample room for a duplicate compressor unit.

Compressed air for instruments is supplied by a compressor using a Scotch yoke instead of the conventional crank and connecting rod. This compressor was selected because of its excellent characteristic of delivering oil-free air. The instrument air passes through an aftercooler and air filters before being delivered to the instruments. There is also an emergency connection that will feed plant air into the instrument system if needed.

Steam is generated by a Combustion Engineering package type water tube boiler with a continuous capacity of 6,000 lb/hr at 130 psi. The great quantities of city water available eliminated the need for a gravity storage tank at the plant.

The main fuel source is natural gas obtained through meters from a high pressure main. Since natural gas is available only on an interruptable basis at one hour notice, an alternate system has been provided utilizing propane as a standby source.

Propane is available as a direct fuel supply for all internal combustion engines on the material handling equipment, while a synthetic gas of 1100 Btu is produced from the propane by direct-fired vaporizers and a Selas gas proportioning system operating under a pressure of 6 lb.

A transfer station east of the boiler house contains a valving system to cut off natural gas and substitute the synthetic propane-air mix without any interruption of production in an emergency.

JOHN G. TRONTELL is Manager of the new Georgia plant; HAROLD J. OTIS is Superintendent; W. W. BAGWELL, Plant Engineer and W. J. WOODALL, Superintendent of Planning and Scheduling.

In addition to production of the J-M line of asphalt shingles and roll roofing and siding shingles, supplementary products are warehoused for distribution throughout the Southeast.

J-M also manufactures a wide range of industrial products including packings, fillers and filter aids, friction materials, industrial insulations and asbestos pipe.

Boiler house is a conventional rigid frame J-M Transite building with the Combustion Engineering boiler set so that its rear wall is exposed for servicing. Adjacent instrument shed is a two-room structure. The generator room is pressurized with filtered air to assure the 100 hp motor generator set clean operating conditions. The control room section of the instrument shed is arranged with its indicating alarms and the recording controllers visible through a large, clear window from the outside. This permits the operator to analyze and act on control problems without entering the room.

All asphalt heating equipment is controlled from this single operating panel. Controls include Minneapolis-Honeywell, Taylor Instrument and Republic Flow Meter units.

Electrical Services

The present connected electrical load of 150 hp is fed from a 750 kva Allis-Chalmers substation with primary voltage of 13,800 volts supplied by parallel overhead feeders. Plant distribution voltage is 480 volts. The substation mat and yard has been planned so electrical capacity can be doubled by the addition of another 750 kva substation when needed.

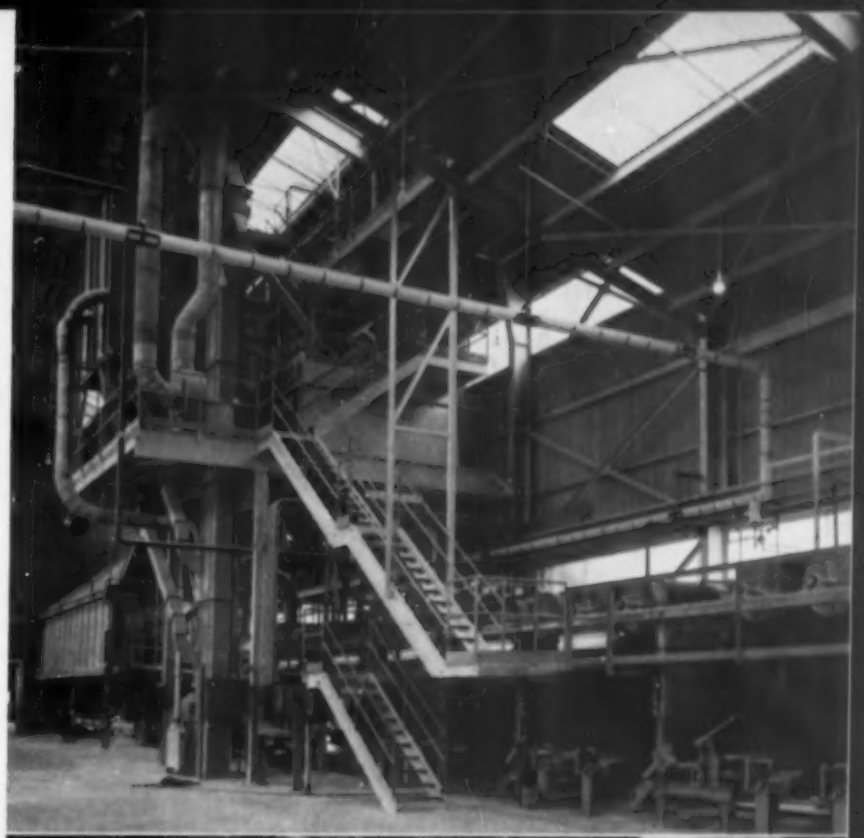
Power is fed from the substation to a four compartment Federal Pacific Electric Co. switchgear unit by means of a tubular bus. Bus is rated at 2,000 amp so no additional bus will be required when the electrical capacity is increased by the addition of a second substation. The switchgear unit consists of a metering compartment and three feeder breaker compartments. The transformer for the metering section is a window type that can be moved out of the compartment. This flexibility is required when a main secondary breaker is needed for additional feeder-breaker sections.

Fused power panels (Trumbull Swing-Wa) located at load centers are fed from the switchgear breakers by means of a cable in exposed

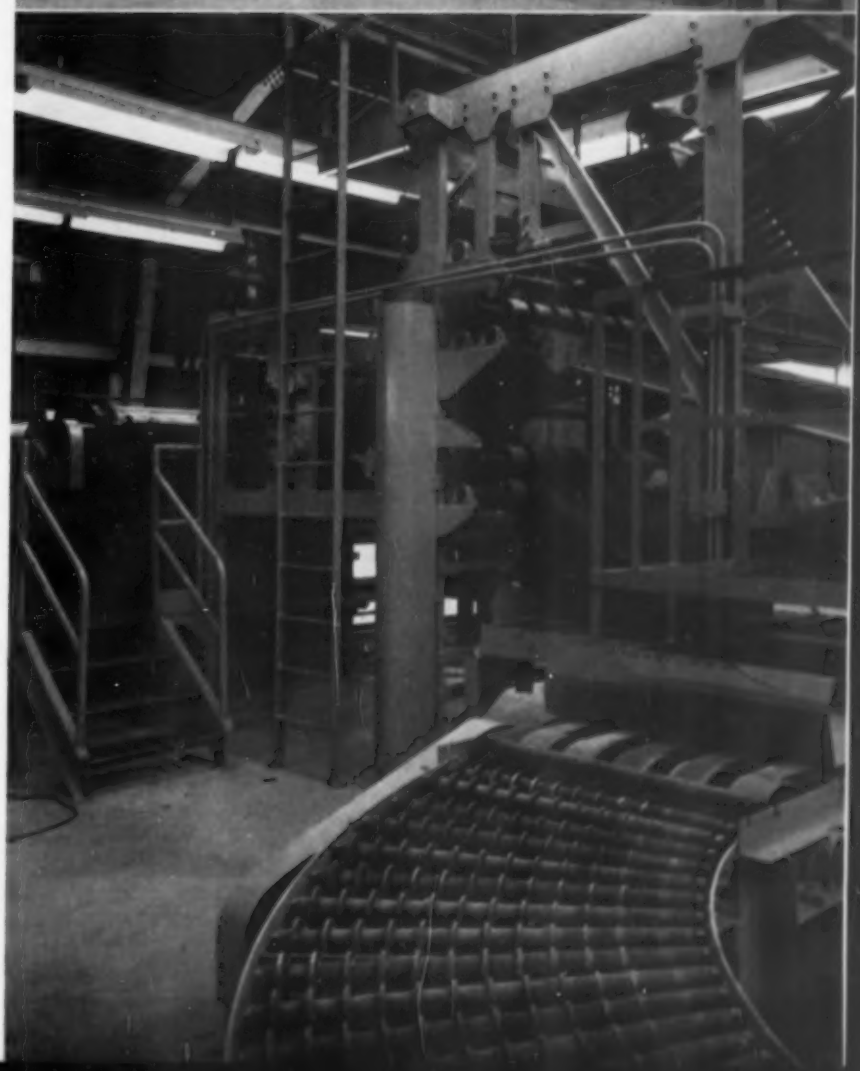
conduit. Local feeders are run from the power panels to built-up starter groups and control centers.

Emergency Lighting—Alarms

The fire pumps (Peerless Pump Div. 1500 gpm units) and emergency lighting system (U. C. Lite Mfg. Co.) are on independent feeders which are bus tapped ahead of the switchgear unit. The fire pump has its own automatic control cabinet for maintaining desired pressure.



ABOVE—This complex machine produces asphalt roofing materials. Roll base belt is introduced at lower left where it is saturated with hot asphalt. It then goes through the coating section where attractive blends of colored slate granules are applied. Nearly 300 tons of finished products may be produced daily by this machine.



BELOW — Finished asphalt roofing shingles are automatically cut, separated, counted and packaged for shipment at this "take off" end of the production line. The machine then ties the package with wire and sends it along the roller ramp to the shipping area.

Exit and emergency lights are independent of the general lighting system. Emergency lights operate on batteries during any power failure. When batteries are not in operation they are maintained on trickle charge.

Fire alarm signal system annunciator is operated by the sprinkler system water valves or by manual operation. The annunciator is located in the boiler house so the firemen can check fire pump operation and so they may give an area signal in any emergency by means of a fire whistle.

Dust and Fume Control

The design of dust and fume exhaust systems was somewhat simplified by the local climate. Heat radiated from the process

machinery during most of the year makes unnecessary the additional heating of make-up air. Roof exhaust units (powered by American Blower axial flow fans), which are used to provide summer ventilation of the machine building, function at reduced air flows in the winter when the building is closed.

Total designed air moving capacity of all units is 115,000 cfm, of which some 21,000 cfm flows through two standard canopy hoods and a dust collecting system.

Fork Truck Handling

The three main buildings were designed for the primary purpose of allowing for fork truck handling of all raw materials, intermediate and finished products.

The truck loading area is completely sheltered by a sprinklered cantilevered canopy. There are 13 "high-low," self-levelling dock boards and two deep truck wells for side loading of flat-bed trucks. There are ramps on both sides of the finished product warehouse to permit access by small trucks or egress by fork trucks for utility work in the paved yard areas.

The truck fleet includes eight Yale fork and ramp trucks with capacities ranging from 4,000 to 6,000 lb, some with side shifters. All have deep-cushion tires, condensing mufflers, engine-hour meters and operate on LP fuel. The fuel containers are 33⅓ lb tanks with plug-in connections. This permits charging the cylinders at the propane station and bringing them to the trucks rather than running each individual truck to a loading point.

Handling Raw Materials

The low cost handling of hot asphalt, filler and granules is imperative in the economic manufacture of asphalt roofing.

Johns-Manville provided for the bulk handling of hot asphalt by building an 1100 ft asphalt pipe line between the plant use tanks and a neighboring supplier's refinery.

This line is elevated and starts at a point 32 ft above the ground and slopes toward the use tanks, thus providing self drainage by gravity. It consists of an 8-in. core line jacketed by a 10-in. standard steam pipe.

Electrical Surveys for Industrial Plants

MANAGEMENT was recently urged to base any expansion or extensive modification of industrial power distribution systems on a sound analysis obtained through an electrical survey. This was the advice of William B. Rollins, chief electrical engineer of Anderson-Nichols & Company, Concord, N. H. Mr. Robbins presented a technical paper, "Electrical Surveys for Industrial Plants," before a session on industrial power rectifiers during the Winter General Meeting of the American Institute of Electrical Engineers at New York.

The growing trend toward automation in most industries today, said Mr. Robbins, is making the expansion of industrial power systems necessary. The electrical survey is essential in convincing management of the need for expansion and as an invaluable aid to profitable and efficient operations.

For the many electrical engineers who are faced with the problems of a survey for the first time, Mr. Rollins outlined survey procedures in his paper.

The first and most important step in a survey is to establish **why it is needed.** Almost invariably the reason is one of the following:

1. Operating costs are too high.
2. Safety of personnel and equipment is inadequate.
3. Load has been increased by expansion of facilities in existing buildings or in additions.

After establishing the reason for the survey it is necessary to examine existing conditions. Primary consideration should be given to:

1. Type of service entrance or generating facilities (or both), including capacity, location and characteristics.
2. Type of distribution, including wire and cable, as well as equipment, such as switchboards, panels and switches.
3. Type of location of loads, with particular emphasis on large motors and panels or other load centers.

Mr. Rollins emphasized that the collection of data is the most important phase of the survey. It is also important, he said, that the engineer collecting the information be familiar with the materials and problems. He suggested that after the drawing of existing conditions has been made, based on field sketches and data, the engineer should return to the plant with the drawing and make a final check or verification before starting the analysis and planning modifications. When all relevant information is at hand, it is analyzed within the framework of the survey's purpose.

Illustration

A typical survey of a relative small manufacturer and resulting changes made in the electrical power distribution system was cited as an illustration of the effect of such a procedure. The new distribution system, the need of which was shown by the survey, resulted in cost per kilowatt hour of $.0182, compared with $.0214, a saving of $103 per month, or 15%. These savings, plus savings in other equipment and in production and increased safety to personnel and greater capacity of the power system, were incurred at a cost of $2,000 for the survey consulting fee and $14,600 for making the changes.

A great many technical problems had to be solved in pumping 500 F plus asphalt through a line that stabilizes at a temperature of 325 F between movements.

The asphalt pipe line now permits the economic transfer of three different types of asphalt required for the manufacture of Johns-Manville products at Savannah.

The filler is a free-flowing mineral base used to stabilize asphalt coating, fine ground through 200 mesh. It is received in hopper-bottom rail cars, unloaded by an air slide into a conveying system that can be directed either to storage or the use bin. The system, except when used for car unloading is entirely automatic and keeps the use bin filled by recovering from storage.

Granules, which are the colored outer protection of asphalt roofing, come to the plant in hopper-bottom rail cars and are unloaded through a track hopper. They are transported by a vibrating conveyor that feeds to the boot of an elevator, and thence to a shuttle conveyor that discharges to any of the bins of the 12 storage silos. Belt conveyor and bucket elevator were furnished by J. D. Christian Engineers.

These silos are of a concrete stave construction 30 ft high with an inside diameter of 9 ft. They are supported on a base that is 12 ft above the ground for unloading from the bottom. They are self-cleaning with charging and discharging points selected to minimize segregation.

The bottom discharge of the silos runs through metering openings to the blending conveyor which, in turn, discharges to an elevator and then to an automatic shuttle conveyor that will select and position itself over any of the 15 bins that supply the roofing machine. The positioning of the shuttle conveyor is automatic. This is accomplished by an elevator control circuit.

The discharge chutes of the shuttle can swing into any of three positions by means of pneumatic cylinders. Selection of position is made by the operator.

There is an over-all manual control built into the system so that the operator, if he is at the remote machine bins, can position the elevator from that point.

Conveyor System Cuts Costs—North Carolina

STOUT Chair Company, Inc., Liberty, N. C. manufactures complete furniture units, school chairs, tables, etc. Formerly they were manually loaded on woolen double-deck dollies which held 65 complete units. The employees who wrapped the units were also responsible for loading the dollies, rolling them to the storage area and unloading and storing the units.

Expanding business necessitated greater space so they added another story to their building. Thereupon, with 16,000 sq ft of additional floor space, a greater material handling problem arose.

Approximately 610 ft of Rapistan-Keystone Overhead Conveyor was installed. Now from the first floor wrapping department, chairs, tables, etc. are placed two at a time on rubber covered hooks of the Rapistan - Keystone overhead trolley conveyor and transported through a small hatch in the ceiling to the second floor storage area. On the second floor, units are unloaded and stored, all in one operation.

Considerably more chairs are wrapped per day because of the new system. Operating and production costs in wrapping, shipping and storing have been sharply cut and there is less effort and strain on employees. Now 3 men (sometimes 2, depending on circumstances) can load 1,000 units in approximately 4 hours.

Loader removes chairs from the Rapistan-Keystone Overhead Conveyor at the truck loading ramp.

Georgia Power Company's Engineer Who Fights Corrosion in Their Steam Plants Tells About Troubles and Cures

Corrosion Experience at Plant McManus

By W. M. STEPHENS, JR.
Georgia Power Company

EXPERIENCE prompts me to make it clear quickly that I make no claims toward being a Corrosion Engineer. As a Mechanical Engineer I was handed, as one of numerous other duties, the problems of corrosion at all steam power plants on the Georgia Power Company system. Thus, I feel that I am being taught the facts of corrosion the hard way.

Plant McManus (described in Nov. 1953 S.P.I.) is a 40,000-kw single unit steam - electric generating station located on the Turtle River approximately 10 miles northeast of Brunswick, Georgia. It is situated approximately 1,000 ft from the river edge on a site which was originally partly island and partly salt water marsh. The site was filled with sand dredged from Turtle River and intake and discharge canals. The plant proper and all major structures are supported by untreated timber piles.

THIS DISCUSSION could probably be better titled **Events Leading Up to the Live Oyster on the Generator Windings** since we think that we have the possibly dubious distinction of being the only electric utility which can make such a claim. More about this later.

The Turtle River is a tidal river and drains several hundred square miles of marsh area. For this and other reasons, the water of Turtle River can be classified as brackish. This water is brought into the plant through a concrete intake structure, containing steel bar trash racks and two traveling water screens, through a concrete tunnel beneath the plant, and there picked up by pump suction bells extending into the tunnel.

Two 17,175 gpm horizontal centrifugal pumps supply salt water to a two pass, divided water box condenser. The pumps have cast iron casings, stainless steel shafts, and bronze impellers. The piping to and from the condenser is cast iron with all iron gate valves. The condenser has cast iron water boxes, Muntz metal tube sheets and aluminum brass tubes.

Salt water is also supplied to two turbine oil coolers, two generator hydrogen coolers, miscellaneous oil coolers and bearings about the plant, and for washing the intake traveling water screens by two 1,250 gpm, one 1,000 gpm, and one 550 gpm horizontal centrifugal pumps.

The cooling, house service, and screen wash water piping is genuine galvanized wrought iron with 300 lb galvanized malleable iron screwed fittings except for flanges which are 150 lb galvanized, screwed, wrought iron. Originally all valves in these systems were "all iron" globe and gate valves with a few bronze valves used in scattered locations. Although the valves were classified as "all iron," they actually have iron bodies, very low carbon steel seats, discs and gates, and high carbon and stainless steel stems.

Since hindsight is so much better than foresight, we can now readily see that our major problem with corrosion would be and has been due to the large assortment of **dissimilar metals in contact with one another.**

Corrosion Problems

Our first indication of coming corrosion problems was a very uncooperative ¾" bronze valve which literally fell off the piping onto the floor. Examination indicated that this was by far the hungriest valve we had ever seen. It had eaten through schedule 80 wrought iron pipe on both ends in less than four months. To combat this problem, we placed a short nipple of plastic pipe between each bronze valve and the wrought iron pipe.

At about this same time we began to have leaking condenser tubes. All of the leaks were occurring in one particular section of the condenser, so after consultation with the condenser manufacturer, it was decided that the corrosion was due to excessive tube vibration in the area involved and therefore we plugged approximately 300 tubes.

Approximately eight months after the plant was placed in operation we began having pitting of iron valve seats and discs and corrosion of the stems. Some of the stems were so badly corroded that it was impossible to open them. We also noticed that the piping adjacent to the valves was badly corroded.

*Mr. Stephens first presented this material before the Southeastern Regional Meeting of National Association of Corrosion Engineers.

To correct the corrosion of the piping, we installed plastic nipples between the valves and piping for screwed valves and insulated large flanged valves with gaskets and bolt bushings and washers. The seats and discs of large valves were replaced with ones made from materials which were as close to the valve body materials as possible. Some of the large valve stems were removed, reground and coated with stainless steel by the liquid spray method.

The forced and induced draft fans are provided with hydraulic couplings, on which are located oil coolers. The coolers had cast iron water boxes and aluminum brass tubes and tube sheets. The water boxes were provided with zinc plugs for cathodic protection which it was found necessary to replace every three months.

Approximately one year after the plant was placed in operation one of the water boxes ruptured. Examination of this water box revealed that the cast iron had completely graphitized, leaving an almost pure carbon shell. These water boxes were then replaced with ones made of aluminum brass. Plastic nipples were used to connect the piping to the water boxes.

An inspection was made of the condenser at this time since we had begun to have leaking tubes in scattered locations. This inspection revealed that the water boxes had graphitized to a considerable extent and that the galvanic current had reversed since slight pitting had begun to appear on the tube sheets and tube ends.

Some of the tubes were removed, split and inspected. The insides of the tubes were covered with a thin tan colored scale with red streaks running longitudially with the tube except where the tubes were rolled. The rolled ends of the tubes were covered with the red scale, oriented in a circumferential direction.

Careful lifting of the red scale indicated pitting in these areas whereas there was no pitting under the tan scale. This was confirmed by removing the scale with a dilute solution of sulphuric acid. It was noted that most of the pitting occurred on the top half of the tube. Approximately 2 ft from the inlet end of the tubes severe pitting started and there was considerable erosion of the top half of the tube.

This erosion is believed to be due to excessive water velocity in the presence of evolution of dissolved air from the water. A careful analysis of partial pressures within the tube indicated that oxygen could be evolved between one and three feet from the inlet end of the tube. To combat this problem, we began to operate only one circulating water pump at a time except during the hot summer months. This type of operation results in some loss of condenser vacuum, but it was felt that this loss of vacuum could be justified by decreased maintenance.

Corrosion Study

At about this time it was decided to make a complete study of the corrosion problems at Plant McManus. Since we were not equipped to make such a study, we contracted with Electro Rust-Proofing Corp. to make the survey and furnish a report of their findings and recommendations.

Electro Rust - Proofing recommended that cathodic protection be applied to the intake structure trash racks and traveling water screens, all underground piping and structures, fuel oil storage tank bottoms, condenser and turbine oil cooler water boxes, and the interiors of the sanitary and house service water storage tanks.

The cathodic protection systems for the intake structure, underground piping, fuel oil storage tank bottoms, and the condenser and turbine oil cooler water boxes are of the applied current types using selenium rectifiers and "Duriron" anodes.

There are two anode beds located each side of the plant and additional anodes are located at the intake structure. Holes were cut in the condenser and turbine oil cooler water boxes and the anodes were installed from the outside of the water boxes.

A 50 ampere rectifier was installed at each ground bed and at the intake structure and a 30 ampere rectifier was installed inside the plant for the water boxes. Before the protection systems were placed in service, all metal structures, piping, conduit, reinforcing steel, etc. were electrically connected to the grounding system.

A network of 500 mcm bare copper cables, which had been originally designed to give a minimum structure to ground resistance for all metal equipment on the plant site, was the grounding system.

The cathodic protection systems for the interiors of the two water tanks are of the sacrificial anode types using magnesium anodes. The interiors of the tanks above the water line were sandblasted and painted with "Debecote."

MORE ABOUT THAT OYSTER. After getting alarms on the generator moisture detector, we were able to locate the offending hydrogen cooler and isolate it while the generator was in service. Later the unit was shut down to make repairs. When the upper half of the end bell was removed it was noted that the field windings were wet. When the Chief Electrician left for a few minutes, a mechanic reached down into the machine and stuck a live oyster to a field coil. Then when the lower half of the bell was removed, the Chief found the oyster. Four months went by before anyone dared give him the facts.

We then contracted with Electro Rust-Proofing Corp. to furnish all materials, supervise installation and to make periodic inspections of the complete cathodic protection systems. We provided all labor for the installation except that for the water storage tanks which was furnished by Electro Rust-Proofing.

There was considerable corrosion of equipment exposed to the salt atmosphere both inside and outside the plant. Several types of paints and coating systems were tried with apparently only two-types giving what we considered good service.

The first of these is a neoprene

coating which is applied only on thoroughly sandblasted and clean metals. This coating was found to have very good adhering qualities and is practically impervious to salt water attack when properly applied to a thickness of about 10 mils.

The second coating is an epoxy resin base paint. This paint has approximately twice the amount of epoxy resins as paints by other manufacturers, and under test, it has been constantly submerged and also subjected to spray in salt water for over a year without any evidence of deterioration.

Approximately one year ago a program was begun to replace all valves, 2½" and under, which were subjected to salt water attack, with Lunkenheimer Fig. 2600 plastic valves. These valves have given excellent service and none have shown evidence of deterioration.

Many Benefits

An inspection of the plant shows that many of our problems have been overcome. For instance, the water boxes on the turbine oil coolers and the condenser are completely protected by the cathodic system. The trash racks and traveling water screens, with minor modifications of the suspension of anodes and a rotating schedule for the traveling screens is being protected by the cathodic system. Valve problems are being eliminated by the replacement schedule for small valves and the insulation of large valves. The interiors of the sanitary water and house service water tanks below water level are being protected by the cathodic systems. Corrosion of underground piping and equipment has been arrested. And chlorination of the salt water by maintaining two parts per million residual for 30 minutes each day has completely eliminated all problems of marine organisms.

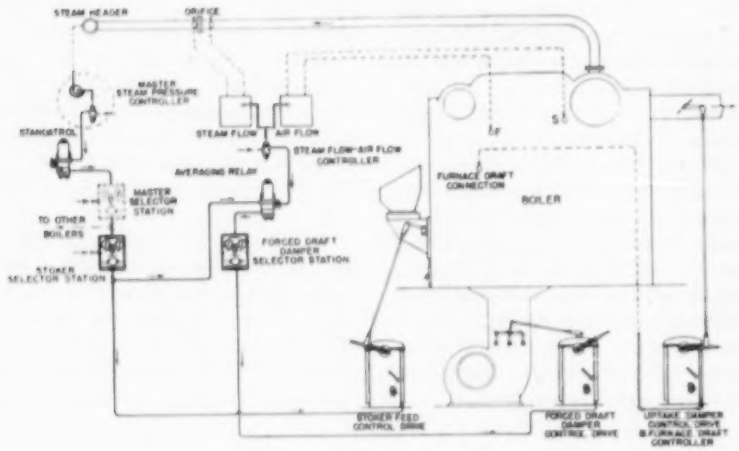
There are, however, a number of problems for which solutions have not definitely been found. The first of these is the problem of pitting and erosion of condenser and heat exchanger tubes. We have, however, learned how to easily locate leaking condenser tubes while the unit is in service.

By cutting off the water to one side of the condenser, plastering the inlet tube sheet with wet paper towels, and soaping the other tube sheet, the leaking tube is located where the soapsuds enter the tube.

A report by The Bridgeport Brass Company, covering the results of a test of copper and copper base alloy panels which were submerged at the Plant McManus intake structure for 386 days, has shed some light on the problem. This test indicates that the loss of metal, on a weight basis, for 70-30 cupro-nickel, containing from 0.4 to 0.6% iron, is about one-half that of its closest competitor which was 90-10 cupro-nickel and about one quarter that of Aluminum Brass.

Comparing the results of these tests with the results shown by C. L. Bulow in *Corrosion and Biofouling of Copper Base Alloys in Sea Water*, the indications are that loss of metal in Turtle River water is about three times that for fresh sea water. For these reasons, consideration will be given to retubing the condenser and heat exchangers with 70-30 cupro-nickel tubes.

It is interesting to note that microsopic examination of the red brass, aluminum brass and Muntz metal samples revealed intergranular attack that left some shallow pits which contained an oxide of copper. Another interesting facet of the attack on condenser tubes is a worm-like erosion on the bottom halves of some tubes occurring at regular points, so that the wave length of the tube vibrations can be readily measured.



Steam Pressure Control

EXPANSION at a South Carolina textile mill called for a new steam generating unit with complete combustion controls.

A Babcock and Wilcox 17,000 lb/hr spreader stoker fired boiler was selected, equipped with instruments and controls of the Bailey Meter Company.

The object of the system engineered combustion control is to insure that fuel is supplied to the furnace in accordance with load requirements and to maintain the proper fuel-air ratio for optimum combustion conditions.

A Master Steam Pressure Controller adjusts the stoker feed and forced draft simultaneously and in parallel to maintain constant steam header pressure. A Steam Flow-Air Flow Controller maintains the desired fuel-air ratio by adjusting the forced draft damper. Uptake damper is controlled to maintain a constant furnace draft.

Actual meter chart records of this installation show that the steam pressure is automatically held constant at all times although the load varies from zero at night to a peak of 7,000 lb/hr during the day. Likewise, optimum air for most economical combustion conditions is supplied at all times.

NPSH

By WILLIS BABCOCK

Chief Development Engineer
Aurora Pump Division
The New York Air Brake Company

PART 3* — Enumerates the factors that determine NPSH and shows how to calculate its value. Examples present three problems and solutions.

CAVITATION begins just to the left of the drop-off point shown on pump selection curves. Pumps should never be selected for any application to the right of the drop-off point on the pump selection curve. It is also important that any pump selection must be made in accordance with the NPSH required by the pump and available at the job. These essential facts were discussed fully in Part 2.

Specific Speeds

The NPSH required by a pump is dependent upon many factors among which are the speed, capacity, head, type of pump, and the design of the suction passages and impeller. All of these factors are included in the designer's criteria of suction specific speed and pump specific speed.

These specific speed criteria are fixed by empirical data accumulated by pump designers over many years of experimental investigation. Suction specific speed is a factor which is of interest only to pump designers. It is used by some designers to compare cavitation behavior in pumps and to derive the most ideal designs from knowledge of an existing pump's performance. Pump specific speed is used in the same manner by pump designers. The formula for determining specific speed is:

$$N_s = \frac{RPM \times \sqrt{GPM}}{H^{¾}}$$

where

N_s = Specific Speed,
RPM = Pump Speed,
GPM = Pump Capacity, and
$H^{¾}$ = Pump Total head

Using an adjustable Elkhart 1⅛" Mystery Nozzle with tap water pressure of 55 psi and with an initial separation of 20 ft between the nozzle and the insulator energized at 40 kv, leakage current through the water stream was checked by connecting a milliam-meter in a lead from the nozzle to ground. The test was discontinued at a distance of four feet between the nozzle and the energized insulator because of excessive water spray. No leakage current was detected. Resistance of tap water used was 650 ohms/cubic inch.

After these initial tests it was found that in order to prevent electric shock, the men handling the nozzle had to stand on a metal plate with the nozzle tied to the plate and the plate tied to the ground.

It also was discovered that the use of distilled water for energized washing will prevent some of the flashover that occurs during washing. The problem of when to wash insulators has no definite answer at the present time, said Mr. Mabe.

Required NPSH

The first rule to use in the application of pumps to critical NPSH jobs is to select the correct impeller type as determined by the specific speed. The second rule is to select the pump so that the NPSH required by the pump at the point of selection is less than that available at the job.

When we mentioned in Part II of this discussion that a head of water in a pan would prevent water from boiling at 212 F we got an inkling as to the importance of the idea of NPSH. All pumps must operate with an absolute pressure on the pump suction above the vapor pressure in order to prevent vaporizing or "boiling" of the liquid so that it may be pumped without damaging cavitation. Because of friction and shock losses in the suction lines and impeller inlet, an additional absolute head above vapor pressure is required by the pump to function satisfactorily.

The NPSH required by the pump is defined as the positive absolute head necessary to overcome suction friction losses, the difference in elevation between the suction nozzle and impeller centerline, and to produce a velocity head in the suction line.

The NPSH required by a pump

Part 1 in the December issue discussed absolute pressure and vapor pressure and defined NPSH.

Part 2 in the January issue defined and explained cavitation, and showed how it is caused and controlled by variations in NPSH.

NPSH (Continued)

is determined only by actual testing of the pump in accordance with supression tests defined by the Hydraulic Institute. Required NPSH cannot safely be calculated since the actual impeller design itself plays the most important role. Even with a near perfect design, casting and machining inaccuracies from pump to pump will prevent two pumps from requiring the same NPSH value. So, a safety factor of one or more feet in addition to the test value is usually added to take care of production variations in impeller castings.

There are several distinct methods of testing for required NPSH. One method is to establish a vacuum on the suction line and let the pump capacity increase until the drop-off point is reached, or establish a capacity and increase the vacuum on the suction until the drop-off point is reached. A second method is to establish a submergence level in a supply tank and increase the capacity until drop-off occurs, or establish a capacity and lower the submergence on the pump suction until drop-off occurs. A third method is to establish a liquid temperature and increase capacity until drop-off occurs or establish a capacity and increase temperature until drop-off occurs. Still another method is to establish a pre-determined submergence and bring the absolute pressure on the level of the supply liquid down to the vapor pressure of the supply liquid.

Each method has a definite value for determining NPSH required for different types of applications. The first method is used to determine proper applications for suction lift conditions. The second method is used to determine NPSH required when the pump will have a positive static suction head or submergence. The third method is used to determine NPSH required for higher temperature applications. The last method is called the suppression method and is defined in the Hydraulic Institute standards.

Oddly enough, each method will produce a different NPSH required curve. In fact, each temperature condition will produce a different curve. The reasons for these variations are not satisfactorily explained, but late theories of the better pump design engineers say that since boiling is a thermal process, the latent heat of vaporization and enthalpy of the fluid state itself determines the required NPSH of the pump.

Each temperature condition requires a different rate of heat flow to produce the latent heat of vaporization which causes boiling. Each temperature and pressure variation then will produce a different required NPSH since the latent heat values will change with both temperature and pressure. Therefore, a pump will actually have an infinite number of NPSH curves.

The problem is not as complex as it sounds since all curves will fall between a band bounded on the lower side by the vapor pressure plus friction and shock losses and minus the velocity head, and on the other by the cold water suction lift NPSH curve.

Suction lift conditions appear to be most detrimental to cavitation free performance. NPSH curves are made primarily from cold water suction lift conditions with an added safety factor of one foot. These curves are very cautiously safe. However, they do not show the required NPSH for hot water or submergence applications which would both require NPSH values less than shown in the curves. Most applications in which NPSH is critical are installations where the pump suction is submerged, and where both submergence and higher temperatures exist.

NPSH required by a pump also varies with different liquids. Friction losses differ between liquids because of differences in viscosities and friction coefficient. Vapor pressure for the same temperature vary greatly between different liquids.

Available NPSH

The NPSH available at the job installation, luckily, can be calculated with very close accuracy.

Table 1: Pressure at Various Altitudes

Altitude Feet	Pressure Psia	Pressure Inches Hg
0	14.690	29.920
50	14.665	29.865
100	14.640	29.810
150	14.615	29.760
200	14.590	29.710
250	14.560	29.655
300	14.530	29.600
350	14.505	29.545
400	14.480	29.490
450	14.455	29.435
500	14.430	29.380
600	14.380	29.280
700	14.320	29.170
800	14.270	29.070
900	14.220	28.960
1,000	14.170	28.860
1,500	13.91	28.33
2,000	13.66	27.82
3,000	13.16	26.81
4,000	12.69	25.84
5,000	12.22	24.89
6,000	11.77	23.98
7,000	11.34	23.09
8,000	10.91	22.22
9,000	10.50	21.38
10,000	10.10	20.58
20,000	6.72	13.75
30,000	4.36	8.88
40,000	2.72	5.54

The basic formula for such calculation is:

$$NPSH = H_p \pm H_s - H_{vp} - H_f$$

where:

(1) NPSH = Net Positive Suction Head (Available)

(2) H_p = Absolute pressure on surface of pump supply liquid. In open tanks this is atmospheric pressure. In closed tanks this is the absolute pressure which is atmospheric pressure minus vacuum or atmospheric pressure plus gauge pressure.

(3) $H_p = \frac{2.31 \times p}{sg}$ (in feet head)

where: (a) 2.31 is a conversion factor for pounds per square inch to feet head water. (b) p = absolute pressure in psi. (c) sg = specific gravity of liquid.

(4) H_s = height in feet of the liquid supply at the pump suction above or below the centerline of the pump. A positive head or submergence is (+). A lift is (—).

(5) H_{vp} = Vapor pressure of the liquid at the existing temperature. If given in psi.

Table 2: Properties of Water at Various Temperatures

Temp. F	Specific Weight Lbs/ft³	Specific Gravity	Vapor Pressure PSIA	Vapor Pressure In. Hg. Abs.
32	62.42	1.0016	.0885	.1803
33	62.423	1.0017	.0922	.1878
34	62.423	1.0017	.0960	.1955
35	62.423	1.0017	.1000	.2035
36	62.423	1.0017	.1040	.2118
37	62.428	1.0018	.1082	.2203
38	62.428	1.0018	.1126	.2292
39	62.428	1.0018	.1171	.2383
40	62.428	1.0018	.1217	.2478
41	62.428	1.0018	.1265	.2576
42	62.427	1.0018	.1315	.2677
43	62.426	1.0017	.1367	.2782
44	62.424	1.0017	.1420	.2891
45	62.423	1.0017	.1475	.3004
46	62.422	1.0017	.1532	.3120
47	62.417	1.0016	.1591	.3240
48	62.417	1.0016	.1653	.3364
49	62.415	1.0016	.1716	.3493
50	62.412	1.0015	.1781	.3626
51	62.408	1.0014	.1849	.3764
52	62.405	1.0014	.1918	.3906
53	62.400	1.0013	.1990	.4052
54	62.397	1.0013	.2064	.4203
55	62.392	1.0012	.2141	.4359
56	62.389	1.0011	.2220	.4520
57	62.383	1.0010	.2302	.4686
58	62.379	1.0010	.2386	.4858
59	62.374	1.0009	.2473	.5035
60	62.368	1.0008	.2563	.5218
62	62.357	1.0006	.2751	.5601
64	62.345	1.0004	.2951	.6009
66	62.331	1.0002	.3164	.6442
68	62.318	1.0000	.3390	.6903
70	62.304	.9998	.3631	.7392
75	62.263	.9991	.4298	.8750
80	62.217	.9984	.5069	1.0321
85	62.169	.9976	.5959	1.2133
90	62.116	.9968	.6982	1.4215
95	62.058	.9958	.8153	1.6600
100	62.000	.9949	.9492	1.9325
110	61.86	.9927	1.275	2.5955
120	61.71	.9903	1.692	3.4458
130	61.56	.9878	2.223	4.5251
140	61.38	.9850	2.889	5.8812
150	61.20	.9821	3.718	7.569
160	61.01	.9790	4.741	9.652
170	60.79	.9755	5.992	12.199
180	60.57	.9720	7.510	15.291
190	60.35	.9684	9.339	19.014
200	60.13	.9649	11.526	23.467
210	59.88	.9609	14.123	
220	59.63	.9569	17.186	
230	59.38	.9529	20.780	

(6) $H_{vp} = \frac{2.31 \times vp}{sg}$

where: (a) 2.31 is conversion factor for psi to feet head. (b) vp is vapor pressure in psi. (c) sg is specific gravity of liquid.

(7) H_f = head loss in suction piping due to friction or shock in changing direction or velocity, in feet.

Example 1

A pump is required to pump 70 F water from a 10 foot static lift. The pump will be used at 900 feet elevation above sea level. The friction and shock losses equal 3 feet. What is the available NPSH?

(1) At 900 feet elevation above sea level, the atmospheric pressure is 14.22 pounds per square inch. Specific gravity of 70 F water equals .9998. (Tables 1 & 2)

(2) Therefore $H_s = \frac{2.31 \times 14.22}{.9998} = 32.9$ feet

(3) $H_s = -10$ feet

(4) Vapor pressure 70 F water = .3631 psi (Chart 2)

(5) $H_{vp} = \frac{2.31 \times .3631}{.9998} = .84$ feet

(6) $H_f = 3$ feet

(7) NPSH available $= H_s - H_s - H_{vp} - H_f = 32.9 - 10 - .84 - 3 = 19.06$ feet.

Example 2

A pump is required to pump water from an open tank with a minimum water level above the centerline of the pump of 10 feet. The unit is installed 600 feet elevation above sea level. The water temperature is 200 F. The suction line losses are 5 feet.

(1) at 600 feet elevation above sea level, the atmospheric pressure is 14.38 psi. The specific gravity of 200 F water is .9649. (Tables 1 & 2)

(2) Therefore $H_s = \frac{2.31 \times 14.38}{.9649} = 34.42$ feet

(3) $H_s = +10$ feet

(4) Vapor pressure 200 F water = 11.526 psi

(5) $H_{vp} = \frac{2.31 \times 11.526}{.9649} = 27.64$

(6) $H_f = 5$ feet

(7) NPSH available $= H_s + H_s - H_{vp} - H_f = 34.42 + 10 - 27.64 - 5 = 11.78$ feet

Example 3

A pump is required to draw water from a closed tank in which 28 inches of mercury is maintained referred to a 30 inch barometer. The head losses in the suction piping is 1½ feet. The minimum submergence head above the pump centerline is 7 feet. The water is at the flash point in the tank.

(1) The absolute pressure on the surface of the water in the tank is 30 — 28 = 2 inches of mercury or 2 x .491 = .982 psi. The specific gravity corresponding to .982 psi is .9945 by interpolation. (Table 2)

(2) $H_s = \frac{2.31 \times .982}{.9945} = 2.28$ feet

(3) $H_s = +7$ feet

(4) $H_f = 1\frac{1}{2} = 1.5$ feet

(5) $H_{vp} = \frac{2.31 \times .982}{.9945} = 2.28$ feet

since the water is at the vapor point.

NPSH (Continued)

(6) NPSH = $H_p + H_s - H_{vp} - H_f = 2.28 + 7 - 2.28 - 1.5 =$ 5.5 feet available.

Useful Factors

When vapor pressure and barometer are given in terms other than psi absolute, use the following factors:

(1) When given in inches of mercury

$$H_p = \frac{1.131\ p}{sg}$$

$$H_{vp} = \frac{1.131\ vp}{sg}$$

(2) When given in feet of water

$$H_p = \frac{p}{sg}$$

$$H_{vp} = \frac{vp}{sg}$$

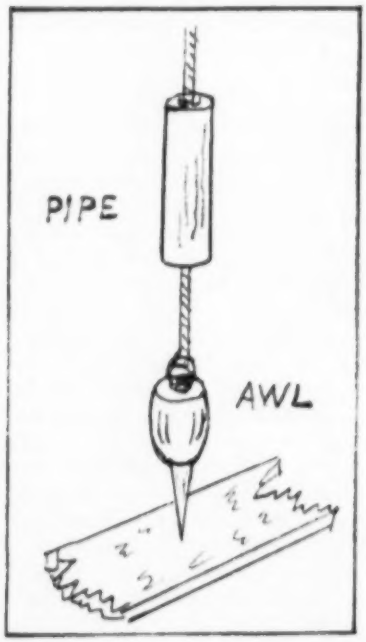
Remember always to allow a foot or so of difference between NPSH available and required to take care of possible head and capacity fluctuations in the system. For instance, if the NPSH available is 6 feet, select a pump for 5 feet or less required.

This concludes a 3-part series of articles on NPSH. Part 1 was in the December issue, and part 2 was in the January issue. A limited supply of reprints is available.

Plant Maintenance Ideas

"Fishing" Technique Clearing Wood from Well

DESPITE every precaution, laborers will leave the top off our factory cistern, with the result that pieces of wood fall in. When the water level is low, such pieces are difficult to retrieve by snaring them with a rope.



We've devised a stout awl that has a sturdy wood handle. In the top of the handle is a steel screw eye, in which a long rope is attached.

The awl is lowered into the cistern until its sharp point rests on the wood, then a short steel pipe nipple is slipped over the rope and let fall. The pipe strikes the head of the awl and drives its point into the wood. Thus impaled, the wood is lifted out, without exasperating "fishing."

By HENRY JOSEPHS, Sarasota, Fla.

Packing Puller Aid

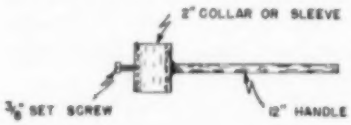
IN ORDER to simplify the removal of old packing from Hancock high pressure valves we have devised a simple device to allow the valve disc and back up ring to pull the packing as the valve stem is pulled from the body.

The device consists of a brass nut of the same yoke thread and dimension as the stem nut, but having a drilled hole to clear the stem threads. After all pressure has been removed from both sides of the valve the packing follower nuts, two halves of the packing follower, the valve handle and the stem nut are removed from the valve. The packing puller is slipped over the stem and screwed into the yoke. The stem nut is screwed on the stem against the packing puller. The packing puller is unscrewed pulling the stem, packing, and disc from the valve body.

By M. G. LEECH, Machinist, Southwestern Public Service Co., Amherst, Texas.

Chiseling Concrete

THE ILLUSTRATED tool has promoted safety in concrete chiseling operations. It is a tool designed to hold a chisel while breaking concrete with a chisel and sledge.



Tool was constructed by welding a 12-in. piece of ½-in. pipe (to be used as a handle) to a 2-in. collar. A ⅜-in. set screw is installed in the collar to securely hold the chisel. Tool has been used in places where an air hammer is not justified.

By PHIL W. PHILLIPS, Roustabout, Katy Gas Cycling Plant, Humble Oil & Refining Co., Katy, Texas.

The photograph at left shows the gaging rolls at wet end of paper machine. The view at right shows the automatically controlled mechanism that operates the stock flow gate.

Board Thickness Automatically Controlled

By FRANCIS A. WESTBROOK

Photos courtesy Electric Eye Equipment Co.

A NUMBER of paper board manufacturers in the South have equipped their board machines with Hurletron electronic caliper and weight control instruments, with the result that the quality of the product has been improved with respect to more uniform caliper and weight, and waste has been greatly reduced.

Variations in thickness, at the wet end of the board machine cause variations at the dry end, so that it is very important to have a quick, accurate means of control at the wet end. The equipment consists of three gauging rollers across the sheet as seen in the photograph. The 2½" diameter rollers are allowed to float in contact with the sheet as it passes over an iron dryer or idler roll at the wet end.

Inside the shell of each gauging head, which is made of stainless steel, there is a small E type transformer, through the primary of which an electrical current is passed. This causes a flow of magnetic lines of force between the gauging head and the iron of the reference roll and through the secondary of the transformer. If the thickness of the paper board varies the reluctance of the magnetic circuit, in which the reference roll forms a shunt, also varies, and consequently the current induced in the secondary will vary accordingly.

The signals thus generated are very small and must be amplified by the electronic circuit in the control cabinet (not illustrated) to operate the recording meters and motor-actuated device for operating the stock-flow gate (see photograph).

In the control panel there is a similar type transformer and iron reference plate which serves as a shunt similar to the function of the dryer or idler on the paper machine. The distance between the standard plate and the transformer can be set for various thicknesses of paper board.

When the distance between the transformer on the machine and the surface of the roll is the same as the distance between the transformer in the master control panel from its iron reference surface, the two are in balance and a zero reading on the recording meter is indicated. If the gap between the gauging head and the reference surface on the roll of the machine becomes larger than the setting of

(*Continued on Page 65*)

PART 1 — What the Plant Engineer Needs to Know About Bearings, Seals and Lubricants . . .

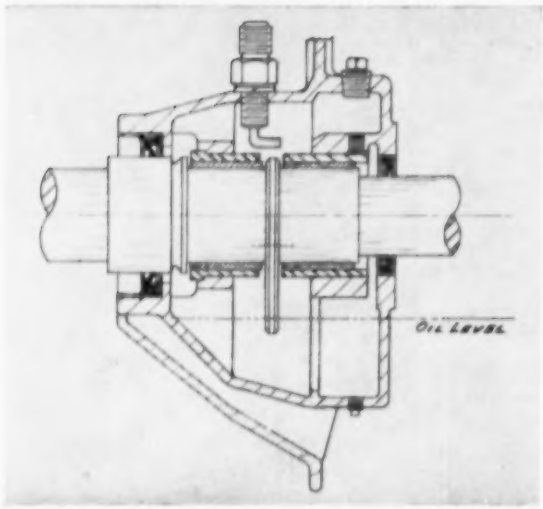


Fig. 1

Maintenance of Electric Motors

By E. P. STAHL
The Garlock Packing Company

ALL TYPES of bearings from sleeve bearings to high precision ball and roller bearings have been used in electric motors. Today you will find three principal types: sleeve bearings, ball bearings and roller bearings. This article will illustrate and discuss these types as applied to present day electric motors with special emphasis on sleeve bearings and ball bearings, the two types most commonly used.

Sleeve Bearings

Early electric motors were equipped with sleeve bearings because they were the only type available for this service. It was not until 1925 that ball bearings began replacing sleeve bearings.

Sintered bronze bearings are still popular for use in small motors due to their low initial cost and low maintenance. The sintered bronze bearing can be prelubricated and used in applications where relubrication is not needed. Sintered bearings are designed to be used in various shaped housings, a popular one being the self aligning type with spherical outside diameter readily providing the self alignment so desirable in a unit of this kind. These self aligning bearings are produced for the larger motors and are not generally found in the miniature types.

Although popular, the sintered bronze bearing is not as popular as the cast bronze bearing, which is normally made from an alloy designated S.A.E. 660 having a composition of 83% copper, 7% tin, 7% lead and 3% bronze. S.A.E 64 having a composition of 80% copper, 10% tin and 10% lead is also a popular motor bearing alloy. There are many other bronze alloys also used in motor bearings.

When working with sleeve type bearings, remember that the shaft is as much a part of the bearing as the bearing itself and as such is subject to wear. This complicates the matter of replacement somewhat as often after a long period of operation the shaft is so much undersize that nothing but poor performance and early failure can result.

Ball and Roller Bearings

Most electric motors in use do not exceed a motor speed of more than 1800 rpm. There are many of course that reach speeds of 3600 rpm or more. Both these speeds are well within the range of good ball and roller bearings.

Some roller bearings are used in large mill motors and where heavy radial loads are present. There are also a few tapered roller bearings used in general purpose motors as shown in Fig. 4.

Fig. 5 shows the application of an oil lubricated solid cylindrical roller bearing applied to a mill motor. In this application the frame is split and the bearing housing is clamped between the two halves of the frame. In this way the housing is held concentric with the motor frame and any tendency of the housing to tip over is prevented by making it of sufficient length to insure a good stable construction.

In this design the bearing housings are prevented from moving endwise out of their normal position by means of flanges on their outer surfaces which fit between shoulders in the motor frame. By boring out both ends of the motor frame at one setting, accuracy is assured within the boring operation, which is usually sufficiently close for the incorporation of the roller bearings.

In this design thrust or shaft "floatation" is taken by a steel thrust collar secured to the shaft

against a bronze thrust plate secured to the bearing housing. Unit or lip type seals, press-fitted into end covers or caps secured to the motor frame, complete the assembly.

Seals and Lubricants

Motor repairs due to oil soaked insulation are among the most frequent as well as the most costly. The use of better housings, and better seals, made possible by the incorporation of high grade, precision ball or roller bearings, will practically eliminate this item of maintenance expense.

Bearing manufacturers and many plant operators prefer oil over grease for mill motor lubrication. Over-lubrication is probably the largest single cause of motor troubles and over-lubrication can more readily be avoided with oil than with grease. Oil can be poured and will establish its own level, whereas at ordinary temperatures this is not possible with grease.

Fig. 5 covering a typical mill motor cylindrical roller bearing mounting shows the manner in which this fact is used to advantage in designing a bearing housing. It will be noted from this design that oil is introduced through an opening placed exactly at the desired lubricant level and consequently it is impossible to introduce too much lubricant. In this way, flooding the bearing with all its disastrous consequences is prevented.

Fig. 2

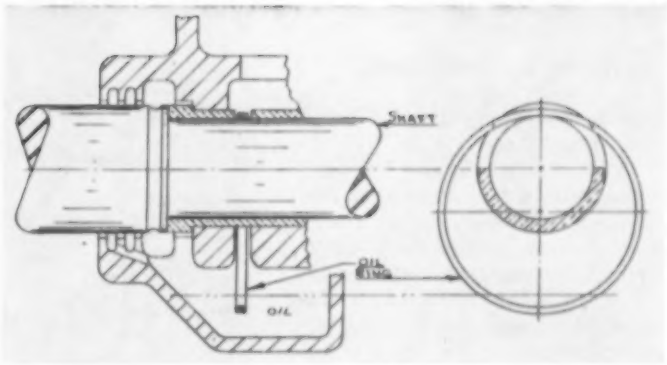
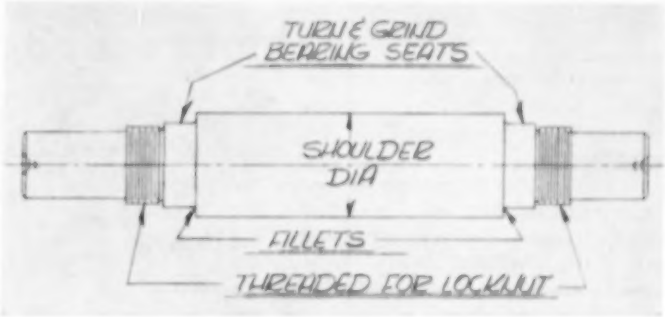


Fig. 3



Heavy duty traction motors used on Diesel electric locomotives use straight cylindrical roller bearings at both the pinion and commutator end on the armature shaft. Such an application is shown in Fig. 6. In this application the cylindrical roller bearing at the commutator end has the double lip construction on both the inner and outer races to take a small amount of thrust or "floatation." The bearing at the pinion end is of the floating construction with a straight

Fig. 5

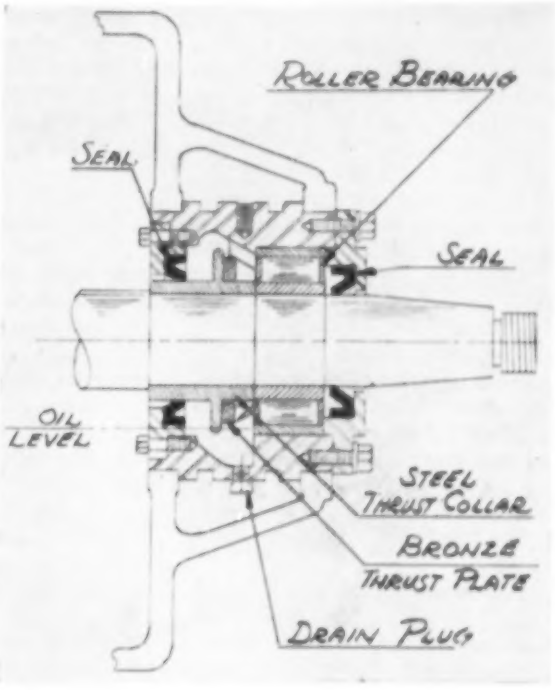
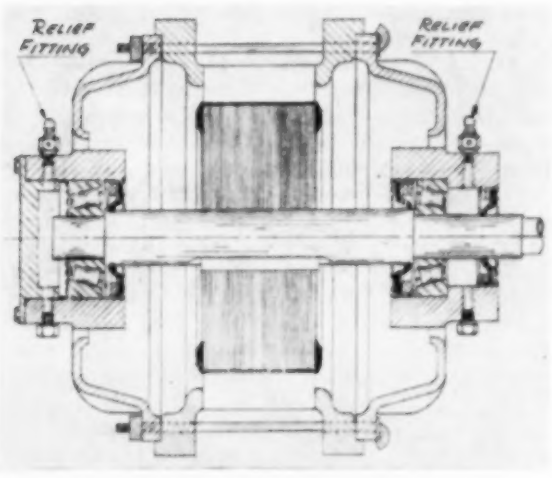


Fig. 4



inner race. Labyrinth seals complete the assembly.

Although it is conceded by bearing manufacturers that it is desirable to lubricate ball and roller bearings with oil wherever possible and practicable, there is a strong sentiment among electrical engineers and shop men in favor of grease lubrication for anti-friction bearings (both ball and roller) used in their general purpose motors. This is largely a result of their unfortunate experience with some oil-lubricated sleeve bearings, from which, because of wear or other causes, the oil escaped into the windings.

It seems natural for them to prefer a lubricant that "stays put" and which is apparently easier to keep out of the windings. However, the ease of lubricating motors with oil, the elimination of over-lubrication by proper use of overflow ports has been proven. The ease of keeping bearing housings tight with good seals as shown in the sectional drawings in Figures 1, 4, 5 and 8 and the greater uniformity of oils over grease can be satisfactorily demonstrated by the operation of one or two ball or roller bearing motors on oil or liquid grease basis.

The old rule of allowing .001 in. running clearance per inch of shaft diameter is a good one to follow and applies to the motor sleeve type bearing as well as those for other equipment. However, the .001 in. rule will have to be altered where high temperature conditions must be met and also where shaft deflections are abnormal.

Whenever and wherever motor shafts for plain sleeve type bearings have to be renewed it is advisable to replace them with shafts having a bearing with low-micro-inch finish. Shaft hardness is also an important factor in reliable and efficient sleeve bearing performance. A shaft that is smooth and hard will have a longer life than its unhardened equivalent.

Fig. 1 illustrates the type of Babbitted sleeve type bearing in common use in large electric motors. It is suitable for fairly high

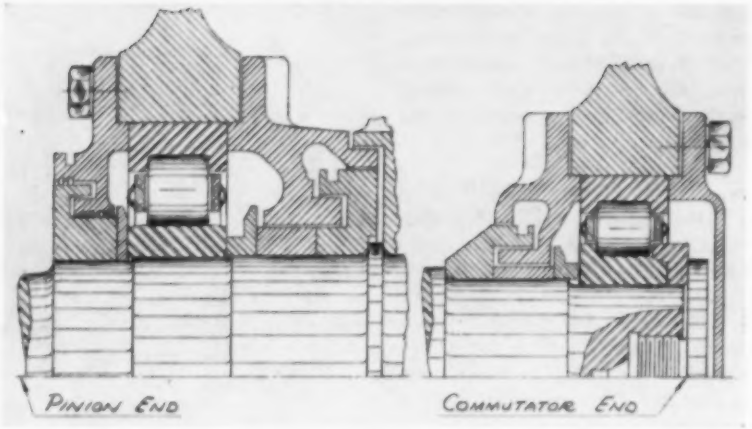


Fig. 6

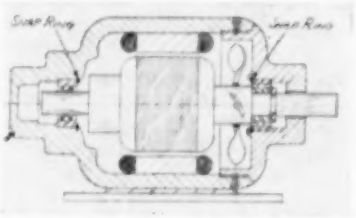


Fig. 7

speeds and for rough, heavy duty applications such as found in steel mills, mill cranes and foundaries.

Unit or lip type synthetic rubber seals as shown in the drawing prevent air currents from passing through the bearing, and equalized air pressure at the inboard and outboard ends prevent oil leakage by suction. This bearing is ideal for continuous service, but is considered less suitable than a ball or roller bearing for start and stop conditions.

Fig. 2 shows a cross section of an oil ring lubricated bronze sleeve bearing used in motors of various sizes. This method of lubrication has been widely used. Its simplicity and durability makes it safe and economical and it requires little maintenances and attention. The ring which is larger than the shaft rides on the shaft and delivers oil from a sump beneath the bearing.

Ring-lubrication can be applied only to horizontal or near-horizontal applications. When the quantity of lubricant is adequate and distributed properly, these bearings have essentially the same load-carrying capacity, losses, and minimum film thickness as pressure lubricated bearings.

Oil disks are often used with these bearings where flow requirements are large. These disks are attached to the shaft or may be an integral part of the shaft and are located at the end of the bearing, dipping into the oil reservoir at the bottom of the bearing housing.

These ring-lubricated bearings are recommended for journal velocities of 2500 rpm or less. At high speeds when heat develops, not enough oil is supplied to the bearing for both hydromatic lubrication and cooling. In applications of this kind a heat exchanger is often required.

Shaft Requirements

A typical rotor or armature shaft is shown in Fig. 3. This design covers a shaft on which ball bearings may be mounted. The first step in properly machining a shaft of this kind requires cutting the length and cutting the ends accurately. Adequately sized centers, which can be used for several machining and grinding operations, are necessary.

During the turning operations sufficient stock should be left on the bearing seats and shoulders for final grinding to size as indicated on the drawing. If there is some doubt about the shaft diameter whether new or used, it should be measured with a micrometer having a .0001" scale. After comparing the average reading with the catalog size of the bearing bore, and it is found that it is going to be impossible to get

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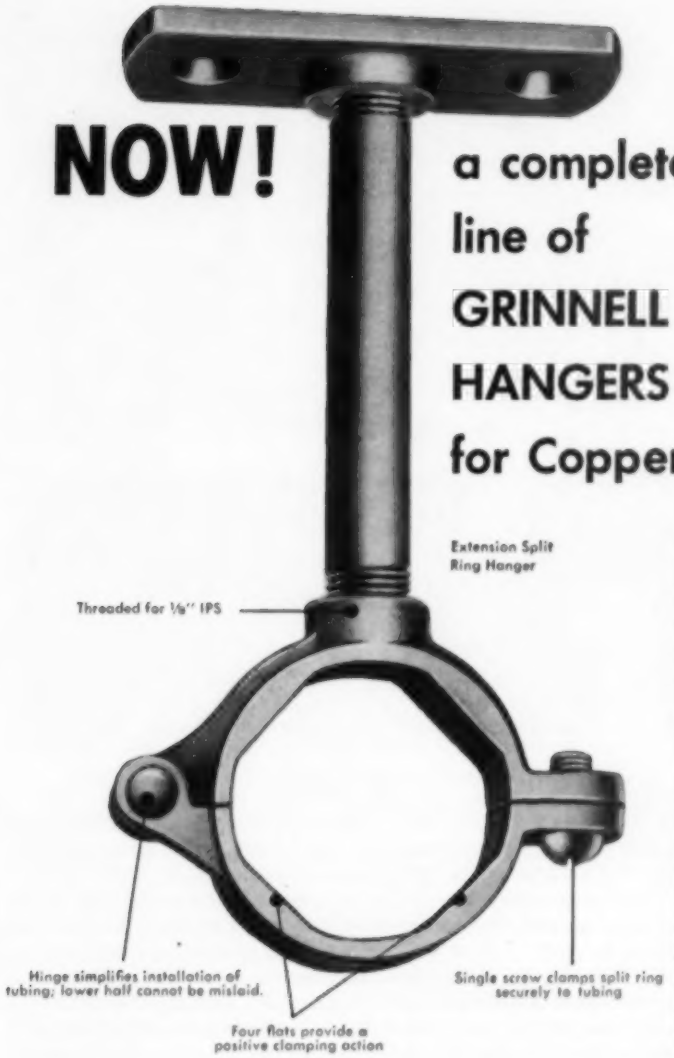
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Motors (Continued)

anything but a loose fit, corrective measures must be taken.

A new shaft is most desirable. However, chrome plating and grinding the bearing seats back to the proper size is satisfactory. A motor user may get some additional service from an undersize shaft under light load if a lock nut is used to hold the bearing firmly against a shoulder. However, a lock nut adjustment is never intended as a substitute for a proper fit between a shaft and its bearing. A lock nut does help to improve a condition somewhat less than desirable, but it should not be depended upon to keep the bearing inner ring from rotating or spinning on the shaft. Unless the surface of the shaft bearing seat is ground smooth the job will not last; Lathe finished bearing surfaces are to be avoided.

Previous portions of this article relate to large and medium-sized general purpose and mill motors. It is appropriate to say something about miniature motors equipped with miniature ball bearings such as used in servos. A sectional drawing of such a motor is shown in Figure 7. The application of the ball bearings in this motor are unique in that the ball bearing shown at the left hand side of the design operates directly upon the rotor shaft with the inner bearing ring omitted. Shaft deflection, if fixed axially at this point, would cause failure due to heat, hence the use of a linear bearing. With this arrangement the shaft can expand axially without cramping the bearings.

Seals

In order that the fullest advantages of ball or roller bearings in electric motors in regard to lubrication, whether oil or grease is used, may be realized, the bearing housing should be tightly sealed with good seals as shown in Figures 4, 5 and 8 to prevent the passage of lubricant out of the bearings on to the windings and to guard against the entrance of dirt into the housing. These mountings show the application of synthetic rubber unit or lip type seals to ball and roller bearing housings to prevent the escape of lubricant and the entrance of extraneous matter.

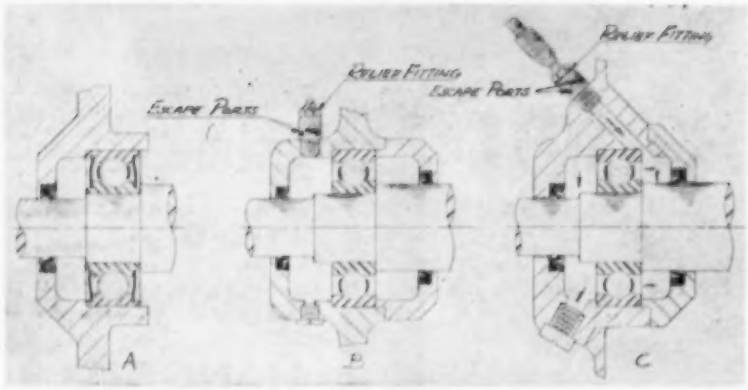
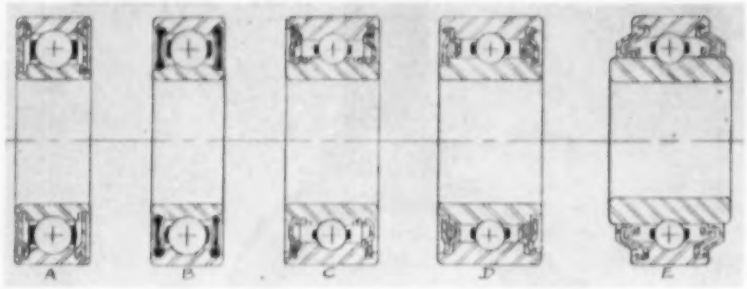


Fig. 8 and Fig. 9 (Below)



Grease groove and labyrinth seals have been used to some extent in electric motor bearings but with these clearance seals there is always a chance of the lubricant escaping from the bearings, working along the shaft and getting into the windings, thereby defeating one purpose of the anti-friction bearings.

Lubrication Features

Let's discuss the merits and demerits of self-sealed grease-prelubricated ball bearings as compared to relubricable bearings mounted in housings and sealed externally with unit or lip type seals as shown in Figures 4, 5 and 8.

The relubricable feature invites over-lubrication especially where a grease gun is used. As discussed previously, more motor bearings fail due to excessive greasing or over-lubrication than under lubrication.

Sometimes the grease is forced into the windings of the motor and early burn out results. This is one reason some motor manufacturers have gone to double sealed grease-lubricated ball bearings as shown in Figure 9, Designs A, B, C, D and E, with good results in many cases. The proponents of these self-sealed ball bearings feel that the life of the lubricant initially packed into the bearings at the bearing factory will be sufficient to give longer life than an open externally-sealed bearing, which may easily be ruined by over-lubrication, possibly at a time when the motor user can least afford to have the machine down.

On the other hand, a relubricable bearing properly mounted and serviced, especially one as shown in Figure 8, Design B and C, may last indefinitely. In these applications the grease is applied by a grease gun at a point close to one side of the bearing cage, and works its way through the space between the balls of the bearing.

The housing in these applications so shaped as to direct even the smallest amount of grease to the area of the bearing where it is most needed. A drain plug is provided to drain out old grease. The

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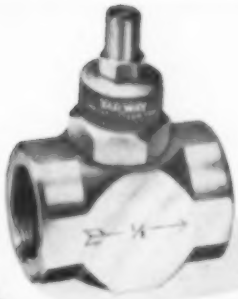

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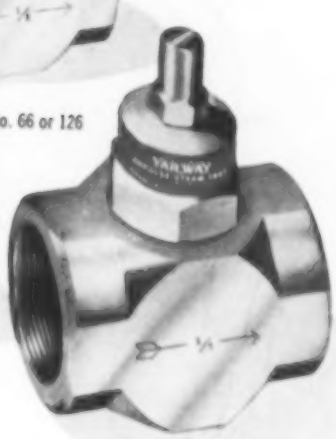

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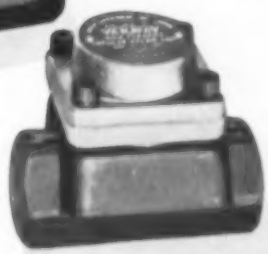

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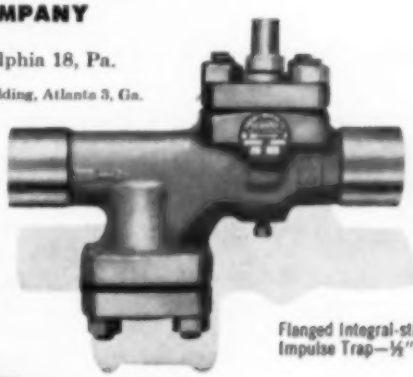

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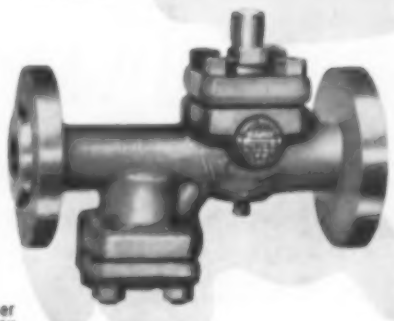

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Motors (Continued)

(*Starts Page* 58)

spring-loaded unit or lip type synthetic rubber seals used in the bearing housings of these designs retain lubricant and exclude extraneous matter. The pressure relief fittings used on the bearing housings guard against over-lubrication.

An electric motor in use eight hours a day is in a different situation than one turning twenty-four hours a day. The service life of the bearings in the eight hour a day motor may be five or six times as long as that in the twenty-four hour operation.

Sealed Ball Bearings

Sealed ball bearings are used on the rotor or armature shafts of a number of general purpose motors for reasons previously given. Several constructions of sealed ball bearings commonly used in electric motors are shown in Figure 9. Figure 9, Design A, is a shield or plate type single row ball bearing. The shield extends into a notch cut into the bearing inner ring. This construction depends upon small clearance to achieve its efficiency.

In recent years, the bearing manufacturers have been successful in developing extremely thin seals for sealed ball bearings as shown in Figure 9, Design B. These seals are made from synthetic rubber with a metal stiffener ring. They are so designed that they can be installed easily and removed by hand for inspection and relubrication. They operate in a rabbet or groove in the end of the inner bearing ring thus forming an effective seal for lubricant retention and dirt exclusion.

Figure 9, Design C, shows a single row deep groove ball bearing with double metal seals of wide flanged construction held in the bearing outer ring with snap rings, which has given a good account of itself in motor designs. These seals are quickly removable for inspection, cleaning and regreasing of the bearing. This bearing is so designed that there is a generous space for

grease between the seals and the balls.

Figure 9, Design D shows a sealed ball bearing with felt seals consisting of two metal plates, which are fixed to the outer bearing ring, enclosing felt washers which contact the outside diameter of the inner bearing ring. This design provides a very efficient barrier to the entrance of foreign matter and the escape of lubricant. Because the felt washer absorbs a certain amount of lubricant, bearings incorporating this seal can be operated at relatively high speeds without excessive heating. Their extra width and effectiveness of the seals make them particularly well adapted for equipment such as fractional horsepower motors.

Figure 9, Design E, covers a sealed ball bearing containing metal seals made of two "dished" plates. Because the seals in this bearing are frictionless these bearings can be operated at speeds comparable to those at which the open type and shielded bearings can operate. This bearing is popular in small electric motors.

This discussion has covered the types of anti-friction bearings used in electric motors, the seals used with them and the methods of lubricating the bearings. The next installment of this 2-part article will go deeper into mechanical maintenance of electric motors.

Waste of Materials

(*Starts Page* 44)

present in the minds of employees is the photographic demonstration of the waste that has taken place, as demonstrated here from the Newport News Shipbuilding campaign. Another method also, illustrated by the photograph in the lower right corner, is that employed by Pangborn Corporation of Haggerstown, Maryland. Their idea is to place price tags on regularly used materials so that workmen will know exactly what they cost.

Your editors believe that the thinking behind such successful campaigns is somewhat like that employed by successful safety departments. The important thing is to keep this somewhat intangible element of plant cost ever in the mind of the workman. Certainly no workman worth keeping on the payroll will purposely be wasteful. He can, however, become negligent whenever this important element in cost reduction is momentarily forgotten or misunderstood.

The editors have a double purpose in carrying this article. First, we believe the procedures demonstrated have definite value and can be used to advantage by many plants.

Second, we believe that many other plants have developed other ideas and procedures that get results. We invite readers of *Southern Power & Industry* to send us proven procedures that have resulted in savings. They will be printed from time to time as a constant reminder and as an aid to other plants that are joining the fight against waste.

Board Thickness Automatically Controlled

(*Starts Page* 57)

the standard in the control panel, less current will be induced in the secondary, and this difference will be shown on the recording meter, which is accurate to .0001 inch.

The induced secondary current is amplified and utilized to position a gate in the filler stock line to control, automatically, the quantity of pulp admitted to the filler vats. It is not affected by moisture, type of stock or anything but the thickness of the sheet. Corrections in stock volume are made only when a definite trend has been established.

Alerting of the machine tenders immediately of any changes that occur on the wet end makes it possible, in many instances, for them to take corrective action before the sheet is lost in the pit due to plugged screens, etc. A large red trouble light gives immediate warning of this type of radical change.

Similar use of another automatic caliper and weight recording instruments at the dry end provide the very practical advantage of furnishing records of the whole finished roll of paper. Formerly the quality of a roll of paper was judged by samples at its beginning and end but this is not necessarily representative of the entire length of finished sheet. Thus a considerable amount of good finished product used to be wasted and returned to the beaters because the end samples were substandard. This can now be easily avoided.

The practical advantages of using this electronic device are savings in stock, increased mill output of more uniform quality, lowered costs and greater customer satisfaction.

Boiler Corrosion Stopped

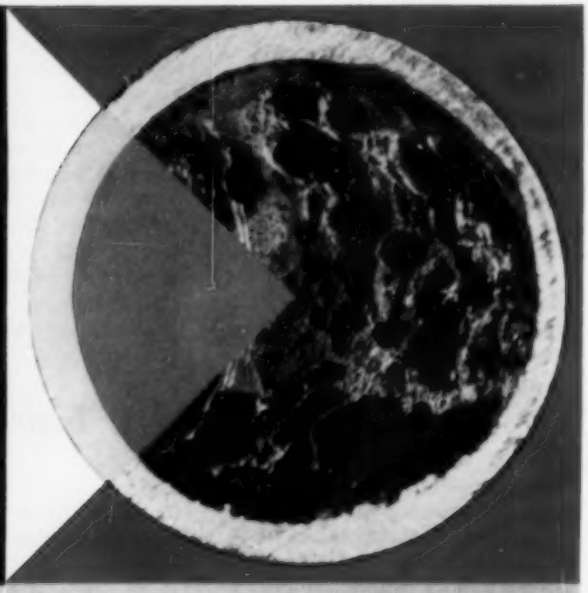
CONTROL of dissolved oxygen in steam boilers has caused many operators serious headaches.

Hoods Dairy of St. Petersburg, Fla., was obliged, due to the Health Department, to abandon well water and use city water. Since they took their supply from a high point in the main, they got an overdose of dissolved oxygen which developed pits up to 2 in. in diameter and ⅜ in. in depth in spite of the fact that many methods were tried. As the boiler was condemned, being beyond repair, they installed a new 100 hp Ames steam generator.

The plant wanted to find some means of protection. As they had been using Sand-Banum products in their evaporative condensers and trucks with most satisfactory results, they contacted the state representative, H. K. Wilson of St. Petersburg, about treating the boiler. He recommended the use of Sand-Banum Anti-Boiler Scale Treatment. This has been in use over one year and a recent insurance inspection showed absolutely no signs of corrosion. This treatment has served the double purpose of controlling both scale and corrosion.

sure cures* for corrosion

IN BOILERS · STEAM LINES
TRAPS · HEATERS
CONDENSATE RETURNS



Anderson ALKASTEEM*

A highly-developed liquid amine which effectively neutralizes carbon dioxide and increases the pH of the condensate. ALKASTEEM has proved its worth over many years in hundreds of systems.

Anderson OX-GEM*

An extremely efficient sodium sulfite product in dry form which reacts with dissolved oxygen in boiler water to prevent corrosion caused by this gas.

Many a system has been wrecked by corrosion at the water line and above it in boilers, steam lines, steam traps, valves, unit heaters and return condensate lines. The most common causes are carbon dioxide and oxygen in the water.

Hundreds of engineers rely on Anderson ALKASTEEM and OX-GEM and the counsel of Anderson's field representatives to check these corrosive gases and prolong the life of their equipment.

There is an Anderson representative in your area who has broad experience with every kind of water problem. He will gladly analyze your water and prescribe the proper treatment to protect your equipment against costly corrosion, rust and scale. His services cost you nothing. They can save you much.

Write, Wire or Phone

SPECIALISTS IN MAKING WATER BEHAVE

Anderson Chemical Company, INC.
Box 1424 • MACON, GEORGIA • Phone 5-0466

Another Feature of the FW Series "SC" Standard Boiler

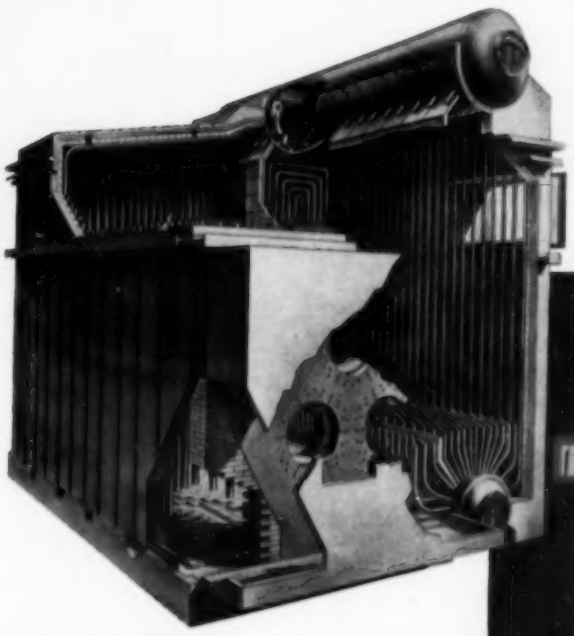
PRESSURE-TIGHT CASING

permits

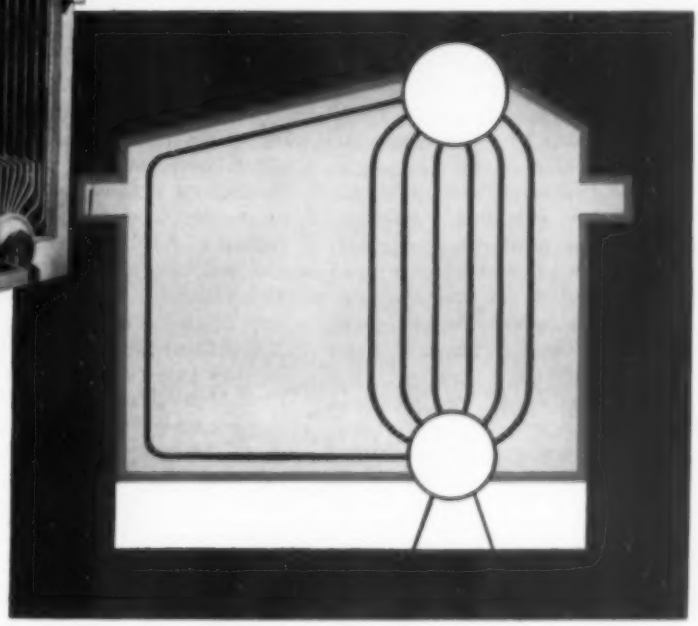
LOWER OPERATING COST

through

MORE EFFICIENT COMBUSTION



Cut-away view of Foster Wheeler "SC" Series Standard Steam Generator



OTHER FEATURES AT A GLANCE

- Completely water-cooled walls
- Over 19-foot firing depth
- Unrestricted circulation
- Fully drainable superheater
- Efficient convection surface
- Bottom supported unit
- Steam purifying system
- Full insulation

THE ALL-WELDED steel casing of the Foster Wheeler Series "SC" Steam Generator forms a rigid, pressure-tight unit which can be arranged for either pressurized or balanced-draft operation.

By eliminating all possible sources of air or gas leakage, this pressure-tight design increases combustion efficiency and contributes to higher fuel economy per pound of steam per hour. No sliding seals are necessary as the stationary casing is welded to the drums and the differential in expansion provided for by an integral horizontal expansion joint which encircles the entire unit. Pressure-tight ports are provided for observation of burners and flame.

These cost-saving FW Series "SC" Steam Generators are available in capacities from 50,000 to 150,000 lb/hr, for pressures to 1500 psi and superheated steam temperatures to 950F. For further information, write for Bulletin B-55-4. *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

FOSTER WHEELER

NEW YORK • LONDON • PARIS • ST. CATHARINES, ONT.

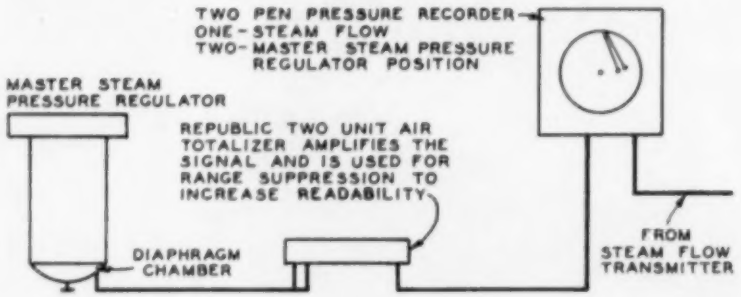
Washing Insulators When They Are Hot

TESTS show that energized insulator washing is a safe, economical method of removing most contaminants from power station insulators and apparatus bushings, thereby eliminating station flashovers. This was the report made by J. M. Mabe of the Central Power & Light Co., Corpus Christi, Tex., during the American Institute of Electrical Engineers' Winter General Meeting in New York.

Energized washing means cleaning the insulators when they are "hot" or without turning off the power. Contaminated insulators can cause flashover with resultant loss or shutdown of power. From 1925 to 1942, Mr. Mabe reported, cleaning was done by de-energizing the insulators and wiping with a wet rag.

As the use of electricity increased, he said, it became more and more difficult to remove the equipment from service for the long period of time required to hand clean insulators.

First attempts at energized cleaning by trying to create artificial rain over the insulator proved unsuccessful because of flashover. Immediately after a 1950 service interruption experienced at the Central Power & Light Co., following de-energized hand-washed cleanings, a test was run to determine leakage currents that could be encountered in washing equipment energized at 40 kv line to ground.


TWO PEN PRESSURE RECORDER
ONE - STEAM FLOW
TWO - MASTER STEAM PRESSURE REGULATOR POSITION
MASTER STEAM PRESSURE REGULATOR
REPUBLIC TWO UNIT AIR TOTALIZER AMPLIFIES THE SIGNAL AND IS USED FOR RANGE SUPPRESSION TO INCREASE READABILITY
DIAPHRAGM CHAMBER
FROM STEAM FLOW TRANSMITTER

Efficiency Indicator

CENTRAL station power plant personnel are continually seeking to maintain peak efficiency of plant equipment. At Gulf Power Company's Scholz Steam Plant a very simple pressure recorder installation has helped to achieve and maintain top boiler efficiency. This plant has two 40,000 kw pulverized coal fired units at present.

The Combustion control systems for the two boilers are Republic Flow Meters Company's Electronic Pneumatic type. Normal operation is to have fuel feed controlled primarily by a signal from the steam flow transmitter, however, the master steam pressure regulator adds to or subtracts from this steam flow signal the amount necessary to maintain steam pressure at the set value.

By measuring and recording the air pressure in the diaphragm chamber of the master steam pressure regulator, an indication of the position of the master steam pressure regulator is obtained. Changes in efficiency are reflected in a change of the master steam pressure regulator position. Other things, such as changes in fuel quality, affect the usefulness of this instrument, however, we feel it a very useful guide.

By L. G. NELSON, Production Office, Gulf Power Company, Pensacola, Fla.

Big Expansion Continues

(*Starts Page* 43)

power systems at the end of 1956 (as estimated for 97% of the industry) was about 123 million kw, as compared to 116 million at the end of 1955.

Scheduled generating capability already estimated for the end of 1959 is almost 160 million kw—37% more than capability at the end of 1955.

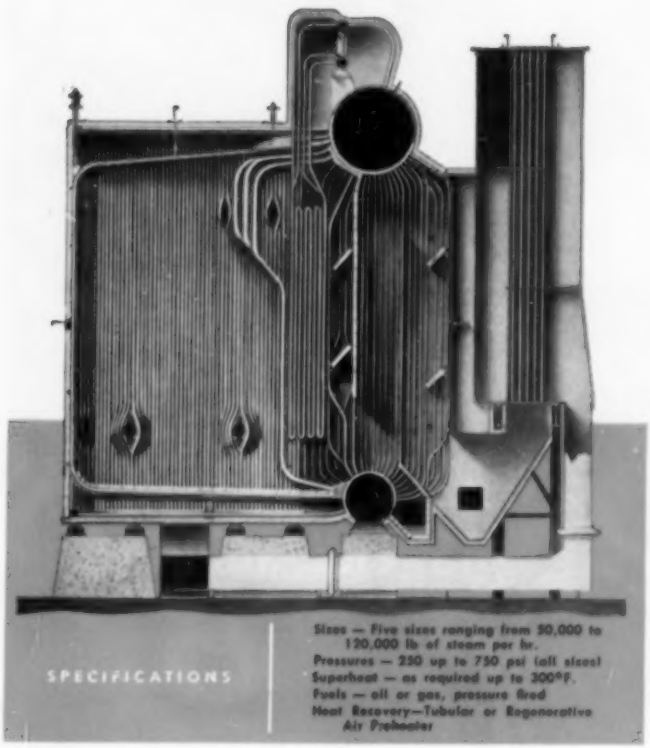
Of the 523 generating units scheduled in the present expansion program, 386 are thermal, totalling 43,138,900 kw. This includes 1,000,000 kw in atomic power projects. Capacity-wise, total thermal units account for 87% of the scheduled expansion. The balance is made up by 137 hydraulic units with a total capacity of 6,388,790 kw.

Peak load for the country as a whole in December, 1956 was estimated at 106 million kw, as compared to 98 million kw in 1955. The December peak load for 1959 is estimated at 132 million kw.

Gross margin (the difference between maximum generating capability and peak demand) was estimated, for December, 1956, at 15.5%. By 1959 this should increase to 20.5%.

Size of thermal generating units continues to increase, with the largest now on order rated at 450,000 kw. In most cases, manufacture of heavy electric power equipment is scheduled at record rates.

THE VU-55 ... AN OUTSTANDING BOILER BUY FOR CAPACITIES FROM 50,000 TO 120,000 LB OF STEAM PER HOUR!



SPECIFICATIONS

Sizes — Five sizes ranging from 50,000 to 120,000 lb of steam per hr.
Pressures — 250 up to 750 psi (all steam)
Superheat — as required up to 300°F.
Fuels — oil or gas, pressure fired
Heat Recovery—Tubular or Regenerative Air Preheater

The VU-55 – a development of Combustion's basic Vertical *Unit* design – offers features never before available in a boiler of its capacity range. If your steam needs call for a unit in the 50,000 to 120,000-lb class, you will find it worth while to consider the economic and operating advantages assured by these VU-55 features:

TANGENTIAL FIRING. More than 20 years of application experience have established the exceptional advantages of tangential firing, illustrated and briefly described below. About 90 percent of Combustion's large utility installations use this advanced method of firing.

DOUBLE WALL, PRESSURIZED CASING. The latest development in casing construction for pressure firing of boilers in the size class of the VU-55, this casing, as illustrated and described below, is designed to assure lifetime tightness with minimum heat loss. Pressure firing permits the elimination of an induced draft fan with its attendant operating and maintenance costs.

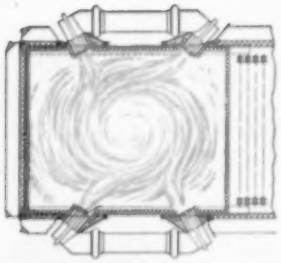
TANGENT FURNACE TUBES. The VU-55's furnace tube arrangement provides complete heat-absorbing, water-cooled protection on all furnace walls. Furnace maintenance is minimized, refractory expense is eliminated, heat absorption rates per sq ft are higher.

SIMPLIFIED ERECTION. Shop assembly of furnace wall panels and boiler screen tubes saves time and money in handling, transportation and erection.

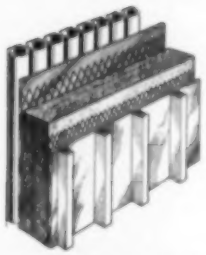
HIGH STEAM QUALITY. Equipped with a large (60-in.) steam drum, the VU-55 has generous water capacity and steam reservoir space. C-E drum internals assure high quality steam at all ratings.

STREAMLINED EXTERIOR. The overall appearance of the VU-55 reflects the efforts of its designers to achieve a completely unobstructed casing, while retaining adequate access wherever required and every facility for convenient operation. There are no outside downcomer tubes, and ducts from air heater to burners are beneath the furnace floor.

Your request for further information on the VU-55 Boiler will receive prompt attention



PLAN VIEW OF FURNACE showing arrangement of burners for tangential firing. Flame streams from the four burners impinge upon one another at high velocity, creating a turbulence unattainable by any other method of firing. The result is rapid and complete combustion. As the gases spiral upward, they sweep all furnace heating surfaces, assuring a high rate of heat absorption.



PERSPECTIVE OF FURNACE WALL. Construction consists of tangent tubes backed up successively by welded steel panels, 4 inches of high quality insulating material and an outer steel casing formed as shown to provide adequately for expansion and assure ample strength. Low heat loss and the tightness required for pressure firing are assured by this double-wall construction.

COMBUSTION ENGINEERING

Combustion Engineering Building, 200 Madison Avenue, New York 16, N. Y.
CANADA: COMBUSTION ENGINEERING-SUPERHEATER LTD.

B 958A

STEAM GENERATING UNITS · NUCLEAR REACTORS · PAPER MILL EQUIPMENT · PULVERIZERS · FLASH DRYING SYSTEMS · PRESSURE VESSELS · HOME HEATING AND COOLING UNITS · DOMESTIC WATER HEATERS · SOIL PIPE

Armstrong High School, Richmond, Virginia
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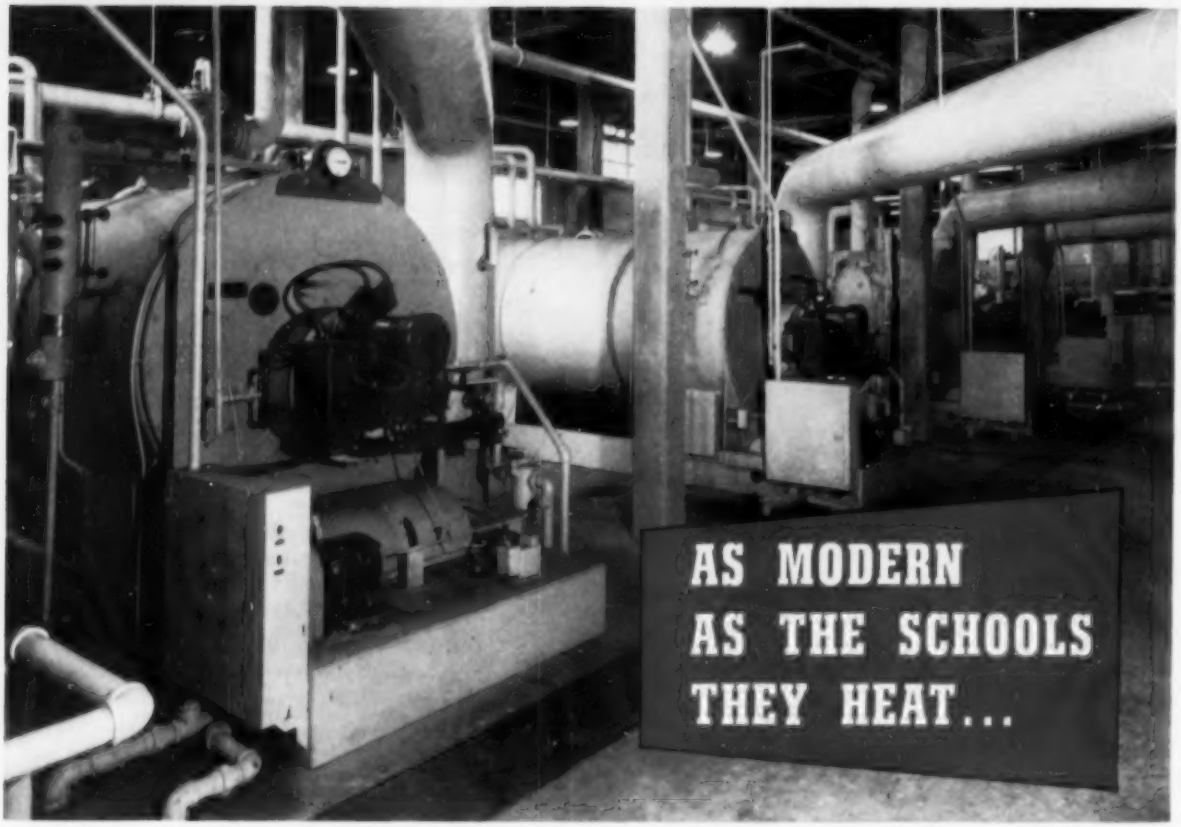
Four 125 hp. Superior Steam Generators for efficient, dependable heat and hot water.



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The excellence of modern school design is setting new standards for all types of industrial and institutional building . . . and it's no coincidence that hundreds of these highly efficient school buildings are equipped with Superior Steam Generators.

Superior Steam Generators offer the same functional design, the same ease of maintenance, the same years-ahead planning, and the same low operating and upkeep costs which make these school buildings outstanding.

Complete packages, ready to go to work when delivered, Superior Steam Generators are factory fire-tested to insure peak performance, and backed by undivided responsibility. They require no expensive setting, no high stack; are equipped with an integrated induced draft system for cleaner, more quiet operation; and are fully automatic burning oil or gas.

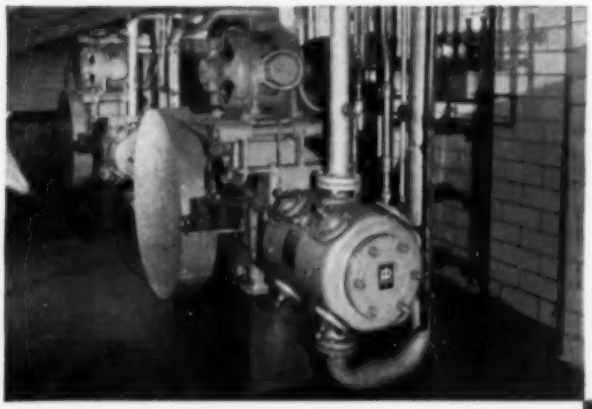
Superior Steam Generators are built in 18 sizes, from 20 to 600 b.h.p., for pressures to 250 p.s.i., also for hot water. Write today for complete details in Catalog 811F.

for performance you can **BANK** *on*

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

SUPERIOR
STEAM GENERATORS

AIR POWER when you need it ...with an ES compressor

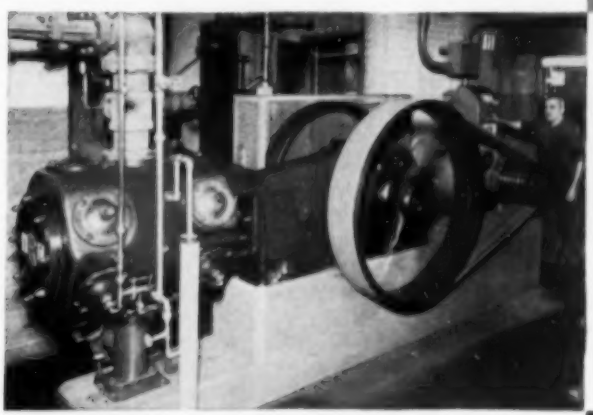


24 Hours a Day

These two Ingersoll-Rand ES compressors are on duty continuously, 24 hours-a-day — supplying instrument air for a large central station power plant. An uninterrupted air supply at constant pressure is essential to the proper functioning of automatic control instruments that have to stay on the job around the clock, month after month, year after year. The overhead motor mounting is but one of the many drive arrangements available.

20 Years of Service

Installed over 20 years ago, this Ingersoll-Rand ES compressor is still in excellent condition — still doing its job dependably, compressing air to 100 psi for general shop service in a large southern manufacturing plant. ES compressors of this age are a common sight in industrial plants all over the country — attesting to the tremendous stamina and long-life built into these heavy-duty machines.



No Forced Shutdowns

Here is one of six 75-hp ES compressors supplying low pressure air in a New England glass manufacturing plant. Since any interruption would result in costly damage to equipment and materials, this company uses dependable ES compressors to furnish a constant supply of process air. Here, as in many other applications, these trouble-free compressors have proven themselves, even under the most adverse conditions.

Ingersoll-Rand ES compressors are available in sizes from 5 to 125 horsepower and for pressures to 2500 psi and vacuums. Horizontal or overhead v-belt drive, direct-connected synchronous motor or steam drives are available. Ask your I-R representative for further details on the unit best adapted to your specific compression problem.

Only I-R compressors have CHANNEL VALVES
Known for high efficiency, quiet operation and exceptional durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and leaf springs, with trapped-air spaces which cushion action.

Ingersoll-Rand
1-393 11 Broadway, New York 4, N. Y.

COMPRESSORS • GAS AND DIESEL ENGINES • ROCK DRILLS • PUMPS • TURBO-BLOWERS • AIR AND ELECTRIC TOOLS

Lightweight Concrete Solves Roof Problem

ADEQUATE drainage without excessive loading is difficult in flat roof deck construction. The usual solution to this problem is to install insulation board on the flat surface of the deck, vaporseal it, then place a sloping fill of medium-weight concrete over all. This provides adequate drainage, but it adds greatly to the load.

Architects for the Tennessee Valley Authority, in designing a group of new TVA electrical generating plants, were faced with this age-old problem. Their solution was the use of ultra-lightweight insulating concrete made with perlite aggregate.

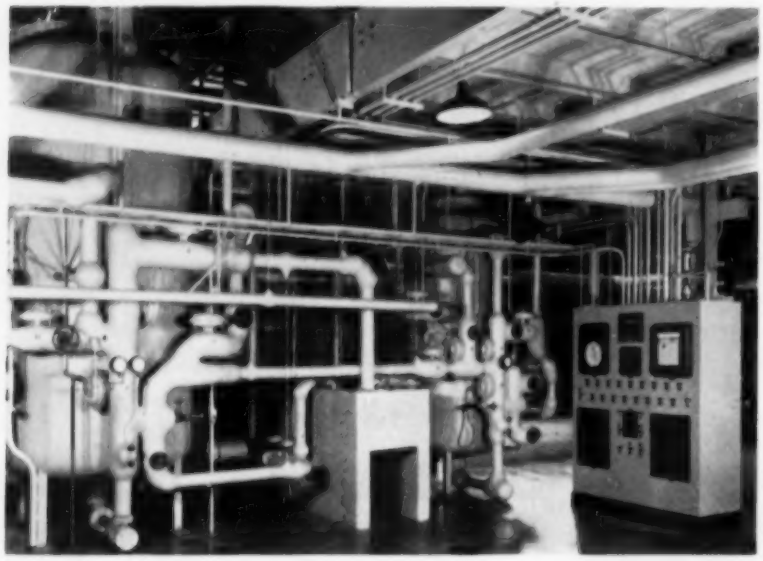
Perlite is a type of volcanic lava that is popped, almost like popcorn, to form white cellular aggregate weighing less than 1/10 as much as sand and gravel. Tiny sealed dead-air cells in particles of expanded perlite give it high insulating efficiency.

Two types of roof deck were used on the six plants. One type was standard lightweight metal structural deck; the other was precast concrete channel slab deck.

In constructing one group of plants, TVA engineers placed standard insulating boards over the metal or precast channel structural decks. They then applied a waterproof membrane (1-ply roofing) over the insulating board and then a fill of lightweight perlite insulating concrete, mixed in the ratio of six cubic feet of perlite to one bag of portland cement. The thickness of the fill varied from four inches to two inches, in order to create the desired drainage slope.

Equally as important as lightweight was the excellent insulation value achieved. The thinnest coating of perlite concrete on the deck — two inches — provided insulation comparable to one inch of insulation board.

At the Gallatin plant, full advantage of this high insulating value of perlite concrete was taken on those areas of roof where the supporting deck consisted of precast concrete slabs. Insulation board was eliminated here, and perlite was used in thickness equivalent to that of the board plus additional build-up of perlite to provide the drainage slopes.



Automatic De-Ionizer installed in a central power station. The cation exchanger is at the left, the anion exchanger at right, and the control panel at extreme right.

Better Boiler Water

VALUE of automatic De-Ionizers furnished by Illinois Water Treatment Co. for a Texas power station has been demonstrated in the course of starting up three large units in two years.

Preparation of boiler units during the cleaning operations has been facilitated by the use of deionized water. Further, availability of pure water for initial fills and subsequent refills during start-up was insured by De-Ionizers.

Silica reduction in boiler water was improved compared to previous experience. Firm output capability of the De-Ionizers — independent of steam production — allowed faster recovery of boiler water purity during a siege of condenser leakages.

Better Lubricant

MISSISSIPPI Chemical Corporation has obtained excellent results from Ucon lubricants used in power recovery engines that operate on exhaust gases from ammonia oxidation processes.

The engines have operated on a Ucon lubricant for more than a year at 475-500 F without a shutdown.

When petroleum oil was used as the cylinder lubricant, maximum operating temperature was 400 F, and the engines had to be dismantled every month or two for carbon removal and cleaning. More power is recovered at the higher operating temperatures.

Mr. W. B. Dunwoody, General Operations Manager at Mississippi Chemical says they are extremely well pleased with the results achieved. There have been appreciable savings on maintenance and downtime of equipment.

Ucon lubricants, manufactured by Carbide & Carbon Chemicals Co., contain no sulfur, and they have excellent resistance to the formation of carbon, varnish, and sludge. When they burn off at high temperatures, they remain soluable or vaporize harmlessly.

Tools on the Spot

METAL finishing requires sharp cutting tools if end products are to measure up to high standards of quality. In a small shop an operator may stop his machine at regular intervals to restore an edge at a nearby grinding wheel. But he loses a lot of valuable hours and the refurbished tool may not perform satisfactorily.

Tube Turns of Louisville, Kentucky, a division of National Cylinder Gas Company, has a far better system, as do most big industries. All edges are ground mechanically by specialists in this work and stocked in expendable tool cribs. Mechanical grinding reduces machine downtime and provides tools with standard angles of slope and clearances found by the plant engineering group to produce the best results.

Tube Turns' expendable tool cribs are strategically located throughout the plant. They carry more than 400 different cutting edges and more than 3,000 other tools used in finishing fittings and flanges. Sharp tools are delivered daily to the machines, on a carefully planned schedule. At the same time dulled tools are picked up for resharpening.

The cribs have an important role in the plant's quality control program, since they make first class tools available round-the-clock. In addition, the crib system minimizes loss of production time.

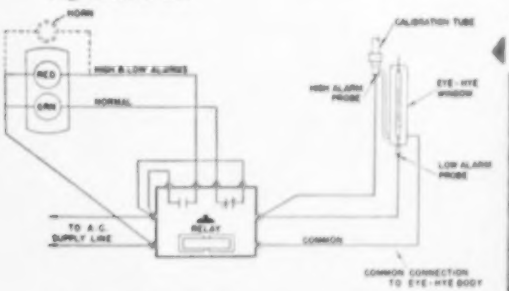
Why not *triple* your boiler water level safety!

Remote reading Reliance EYE-HYE gives you extra sound and sight alarms when you add the Levalarm

Improve the safety of water level supervision *even more* than EYE-HYE's recognized remote reading advantages; add *extra alarms* at small cost. Reliance electrode Levalarm EA9 augments the illuminated sharp-reading EYE-HYE with vibratory horns or signal lights, or both. They work instantly to alert operators when water levels reach danger points.

The boiler water itself calls the signals! Stainless steel electrodes with teflon insulation pick up a tiny current. Sensitive relays make or break independent circuits that operate the alarms. Levalarms work on low pressure or high.

Reliance Light Indicators, 2-light or 3-light, show green for normal water level — red for dangerous low or high condition. Horns are sturdy noise producers that demand action . . . Low alarm Levalarm can be installed on most EYE-HYEs in service. High alarm facility must be added at our factory. Send EYE-HYE serial number and ask for catalog section C6.



Wiring diagram for high and low alarm hook-up with 2-light indicator and/or horn.

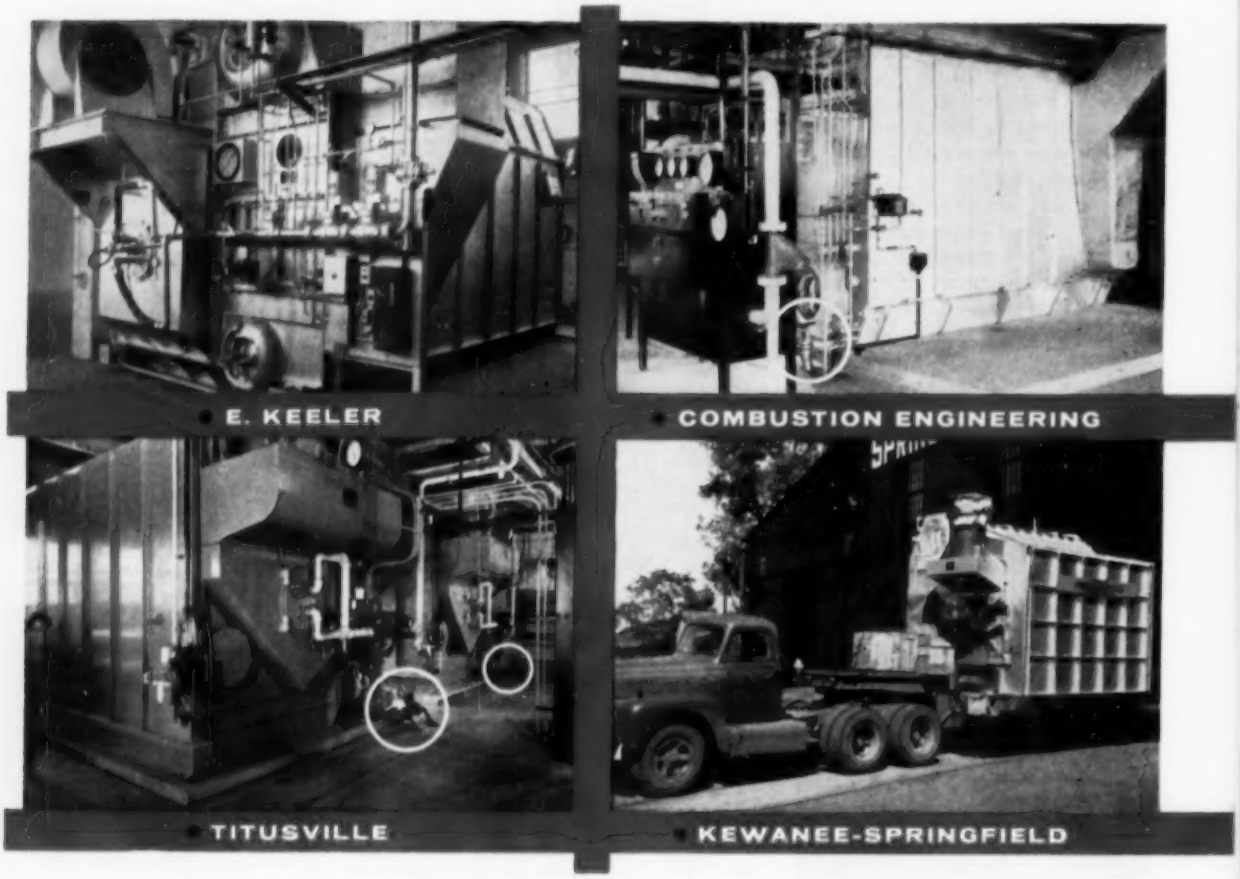
Example of compact hook-up—EYE-HYE with horn and 2-light indicator. The extra signals can be placed any desired distance from the EYE-HYE.

Electrodes used in Levalarm EA9 withstand effects of high temperatures. Require no adjustment.

The Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, Ohio

the blow-off valve trend on "package" boilers is

YARWAY SEATLESS



YARWAY® **BLOW-OFF**

■ More and more leading manufacturers of package-type boilers are featuring Yarway Blow-Off Valves on their units. Many are standardizing on Yarways.

The reason—good blow-off valves help good package boilers *perform better*.

Yarway—known for nearly 50 years for *quality* blow-off valves—offers advanced design, dependable service, and reasonable cost . . . three features attractive to all boiler users.

The Yarway Seatless Blow-Off Valve, with balanced hollow sliding plunger and no seat to score, wear, clog or leak, is the most widely used valve for low and medium pressures.

Specify Yarway Seatless Blow-Off Valves on your package boilers. All boiler makers will supply them.

For full description of Yarway Seatless Blow-Off Valves write for Yarway Bulletin B-426.

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Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.
Southern Representative:
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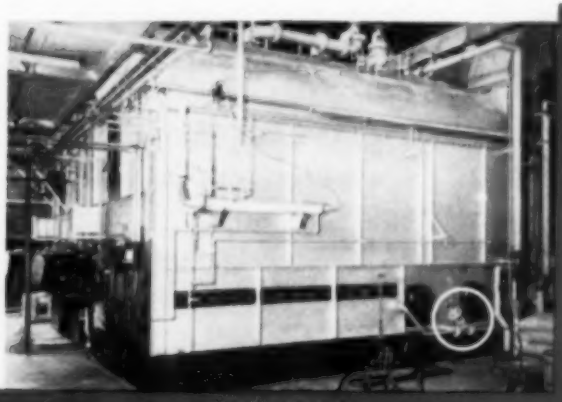
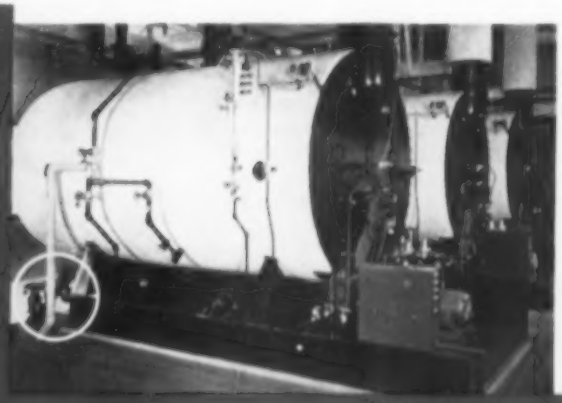
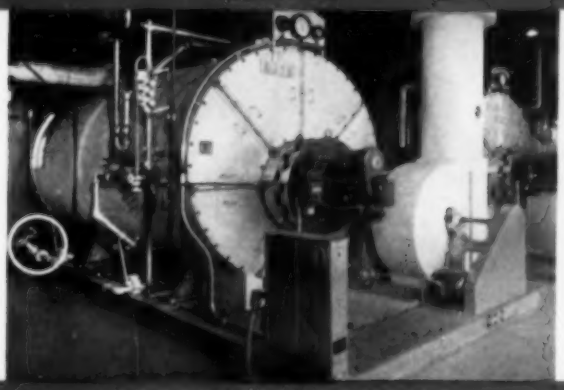


• ERIE CITY



• CLEAVER-BROOKS



• PREFERRED UTILITIES

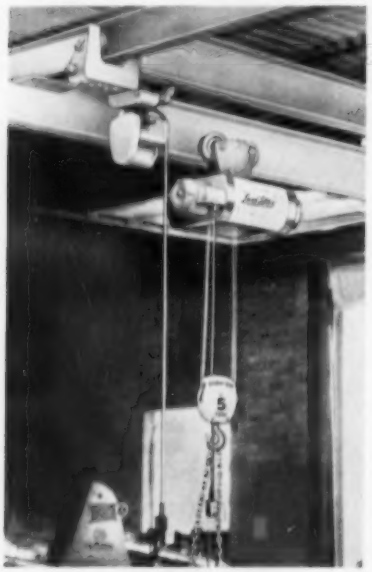
• **Yarway Seatless Tandem Blow-Off Valve** (angle-straightway combination) with angle valve sectioned to show balanced sliding plunger design.

• **Yarway Seatless Tandem Blow-Off Valve,** angle-angle combination, straightway-angle or straightway-straightway tandems also available.

VALVES

Hoist Runways

BERRY BROS. Machinery Co., Shiloh Road at Highway 80, Dallas, Texas, repairs, rebuilds and sells road and construction machinery. After installing two underhung crane assemblies and electric hoists manufactured by Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore, Mr. Sherman Berry stated he didn't know how they'd gotten along without this equipment during the previous 14 years they'd been in business. Before erecting the new building in which the Shaw-Box equipment was installed, they depended upon a single monorail system supporting old style chain blocks for removing and installing heavy parts in machinery. This drastically limited their floor coverage and capacity and made for slow job cycling.

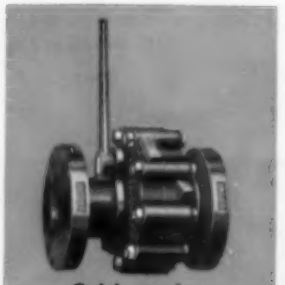


The Shaw-Box equipment included two "H-SUH" Crane Components with which Berry Bros. fabricated two electric hoist runways, one of which is shown in the accompanying picture. Reported saving on each installation was $400.00.

Each hoist runway is electrically driven by a Shaw-Box No. 106 'Budgit' Bridge Drive for speedy work cycling. Hoisting is done by two 5-ton Shaw-Box Series "700" 'Load Lifter' Electric Hoists.

Combine them

any way you choose for your boiler blow-off



Quick-opening

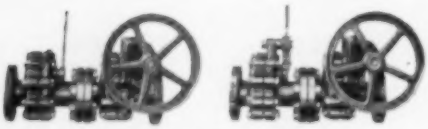
Slow-opening Angle Type

Slow-opening Y Type

Straightway and Angle Duplex Units

Straightway and Y Duplex Units

Angle and Y Duplex Units



Straightway Duplex Units

More than a dozen different arrangements of valve designs and operating methods are available to you in the complete Everlasting line of boiler blow-off valves for operating pressures up to 600 psi. Here is a range of selection from which you can get exactly the combination you wish.

For half a century, Everlasting Valve designs have been proving their effectiveness, reliability and durability—the kind of service you need for boiler blow-off. Each design fully meets ASME Code requirements. **WRITE FOR BULLETIN**

For "everlasting" service, use

EVERLASTING Valves

EVERLASTING VALVE CO.
53 FISK STREET, JERSEY CITY 5, N. J.

EV264

For the Engineer's Bookshelf

Casting Aluminum

PUBLISHED BY REYNOLDS METALS COMPANY
Desk PR4810
2500 South Third Street, Louisville 1, Kentucky
130 page handbook
Free upon request on company letterhead.

The handbook's purpose is to provide a better understanding of the design and production of aluminum castings by inclusion of clear and concise information to help the designer select the casting process and the aluminum alloy best suited to meet the requirements of the product and by presenting typical mechanical properties.

Included in the handbook are: important features of aluminum castings; explanation of various pig and ingot classifications used by the industry; the effects of the common alloying elements used with aluminum; discussion and characteristics of alloy classifications; data on alloys and hardeners introduced and promoted by Reynolds to enable the foundry to produce its own alloy metal; aluminum casting processes; selecting the alloy; aluminum casting design; molding and coring; melting, fluxing, and pouring; trimming and cleaning; heat treatment; machining and finishing; defects, quality control and salvage.

Twenty-three tables offer information including chemical composition limits for the various alloys, typical mechanical properties at room and at elevated temperatures, fabricating characteristics, recommended cuts, feeds, and speeds for machining aluminum castings, typical heat treatments, typical core sand mixes, permanent-mold and die-casting tolerances for aluminum alloys, pattern maker's shrinkage for sand castings in various metals, and a comparison of weight of aluminum with equal volume of other metals.

Trane Refrigeration Manual — Third Edition

PUBLISHED BY THE TRANE COMPANY
La Crosse, Wisconsin
132 pages
Price, $1.50

This revised manual (14th printing since first published in 1946) is to aid the contractor and others interested in understanding equipment used in the refrigeration industry. All components of refrigeration systems are discussed, including detailed explanations and descriptions about the selection, installation and servicing of compressors, evaporators, condensers, etc.; controls for refrigeration equipment; refrigerants and the refrigeration cycle; refrigeration piping; trouble analysis and common service operations. Text material is supplemented by tables, photographs, line drawings and graphs.

Included also is new information on condenser fouling factors, motors and motor control equipment, mufflers, single and multiple compressor piping arrangements, calculating Freon-22 piping sizes, pipe hanging and insulation of piping, Freon-22 charging, and new tables for the chapter on thermostatic expansion valves.

The Modern Building Encyclopaedia

EDITED BY N. W. KAY
PUBLISHED BY PHILOSOPHICAL LIBRARY INC.
15 East 40th St., New York 16, New York
768 pages
Price, $15.00

Many specialists with wide experience have helped to make this comprehensive reference work meet a need within the building industry and its allied trades.

The scope is quite wide, including all the trades and professions associated with building, and in some cases the manufacturing processes applicable to the materials used. The entries are not confined to simple definitions. Many consist of broad introductions to subjects, while others describe the detailed work involved in operations such as Arch Construction, Plastering, Drainage, and Plumbing. Other entries are concerned with the tools used in various crafts, and the special applications of mathematics, chemistry and mechanics involved.

The encyclopaedia contains nearly 4,000 entries, and forms a comprehensive guide to the terms used in the theory and practice in present-day building techniques.

The Foreman's Handbook (Third Edition)

EDITED BY CARL HEYEL
PUBLISHED BY MCGRAW-HILL BOOK COMPANY, INC.
330 West 42nd St., New York 36, New York
578 pages
Price, $6.50

This volume provides the foreman with practical facts he must know to solve general and specific problems in connection with his daily work and in dealing with other departments. At the same time, the handbook helps him develop the broad background needed for additional advancement.

Twenty-four experts contributed chapters on their specialties. Subject matter includes a breakdown of the foreman's job, work planning and scheduling, safety pointers, merit rating of employees, and things the foreman should know about modern labor legislation.

Each chapter can be read independently of the others for quick, complete reference — yet all chapters are interrelated and are presented in logical order. Subjects covered include statistical quality control, predetermined time standards, principles of incentive wage payments, the point system, etc.

Professional Engineer's Examination Questions and Answers

BY WILLIAM S. LA LONDE, JR.
PUBLISHED BY MCGRAW-HILL BOOK COMPANY, INC.
330 West 42nd St., New York 36, New York
462 pages
Price, $6.50

The questions and answers in this guide provide candidates for engineering licenses the closest possible idea of what the real examinations are like and what they need to know to pass.

This selection of over 500 questions was drawn from recent actual examinations for Professional Engineer License, Land Surveyor License, and Engineer-in-Training Certificate. For every question there's a detailed answer of the type examiners accept and credit.

Equipment . . . Supplies . . . Methods

FOR FREE INFORMATION — Circle Code Number on Page 17 Return Card

Easy on
Insert bushing in sprocket. Match holes. Slip onto shaft. Put screws in two holes farthest apart.
Align sprocket. Tighten screws. As bushing is wedged inward it contracts, grips shaft with shrunk-on tightness.
Easy off
Take both screws entirely out. Insert one in the third hole, which is threaded in bushing only. Use as jackscrew.
Disengaged bushing releases grip, permitting quick, easy removal with no shock to bearings or machinery.

Double Strand Line of Taper-Lock Sprockets

B-1 Double strand roller chain sprockets that require no reboring or other machining for installation on shafts are being added to the Taper-Lock sprocket line now offered by **Dodge Manufacturing Corporation** of Mishawaka, Indiana.

The new double strand sprockets incorporate the same Taper-Lock principle used in millions of installations for mounting other Dodge products, such as single strand sprockets, V-belt sheaves, conveyor pulleys, and flexible and rigid shaft couplings.

This method enables users to take sprockets, together with bushings of the desired shaft size, directly off the shelves of distributors and mount them quickly and securely without reboring, key-seating or set-screw machining. This provides the equivalent of a shrunk-on fit, regardless of whether the shaft is turned and ground or cold rolled, standard or normally undersized.

Available in pitch sizes ranging from one-half inch to one inch, the new double strand sprockets meet the demand for greater capacity roller chain drives with all the easy-on, easy-off features of Taper-Lock.

The installed cost of Taper-Lock sprockets is usually less than that of ordinary sprockets that have to be bored to shaft size. Another economy feature is that the Taper-Lock bushing can be used again and again. If the sprocket becomes worn, only the tooth part needs to be replaced. A Taper-Lock sprocket occupies no more space on the shaft than other sprockets, and the flush design contributes to safety.

Taper Face Flange Protects Valves; Lowers Instl. Cost

B-2 A new 125 lb taper face lightweight welding neck flange, introduced recently by **Tube Turns**, 224 East Broadway, Louisville 1, Ky., offers important technical and cost advantages where the lighter schedule of pipe must be connected to 125 lb cast iron valves and other equipment. The flange, on which a patent is pending, overcomes two difficulties.

First, its tapered face causes greater pressure to be exerted near the bore. This eliminates the usual problems met in obtaining a leak-proof seal when a conventional flange with a full face gasket is used.

Second, strain gage tests have shown that the new flange, equipped with a full face gasket, can be safely bolted to cast iron or semi-steel flanges. That is, it will not overstress or crack them, nor the integrally cast valves, pumps and

Plant, Research Laboratories and World Headquarters

BETTER FASTER

Low Temperature EUTECTIC WELDING ALLOYS

STRONGER WELDS

EUTECTIC Welding News

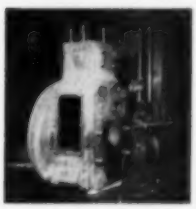
PUBLISHED BY EUTECTIC WELDING ALLOYS CORPORATION, 40-40 172 STREET, FLUSHING 58, NEW YORK, N. Y.

"EUTECTIC" WELDING HEADLINES • TIME-MONEY-MACHINERY SAVERS

FREEZING WEATHER—CRACKED MOTOR BLOCKS!
BETTER, FASTER REPAIRS WITH XYRON 2-24

Cracked motor blocks caused by freezing are no longer a winter headache—no longer an extensive and difficult repair job. Fast, permanent repair of cracked blocks is easy with Xyron 2-24, an electrode that permits "cold" welding of cast iron in all positions without dismantling heavy sections. Xyron 2-24's special "Frigid Arc" flux coating makes application particularly easy and its high tensile strength (up to 50,000 psi) provides welds with great resistance to wear and impact.

Repair should be accomplished as follows: Before welding, examine block carefully to determine exact extent of damage. Clean block thoroughly. Drill holes at each end of crack to prevent lengthening. Gouge a 75°-90° chamfer along edge of crack with Eutec-ChamferTrode, high-speed gouging electrode for all metals. Pre-heating is not necessary, but if maximum machinability is required, pre-heat to 400°F. Use AC or DC straight polarity and weld with short to medium arc at minimum possible amperage. Use skip welding technique to avoid overheating. Allow block to cool to hand heat between passes and peen to relieve stress.



Deposits of Xyron 2-24 are dense, machinable, and crack-free. Danger of warping, distortion, and stress is minimized or completely eliminated. In addition, Xyron 2-24 provides greater economy through lower consumption of material and shorter working time. Xyron 2-24 may be used to fill holes and build up missing sections and is suitable for grey and tempered cast iron and for joints with copper and steel. **(A-41)**

XYRON 2-25 ELIMINATES $1300 REPLACEMENT COST

Excessive keyway play cracked this $1300 cast iron roller wheel hub, but replacement was not necessary. Following the advice of Eutectic's District Engineer, a highway maintenance supervisor had the hub repaired at a cost of $100 with Xyron 2-25. A patented, non-cracking cast iron electrode, Xyron 2-25 welds all types of cast iron and cast iron alloys without the cracks, "leakers," and stress formations caused by conventional high heat cast iron electrodes.

Fig. A

Damaged area of the hub was quickly gouged out with Eutec-ChamferTrode, high speed gouging electrode for all metals. (Fig. A.) After the vee had been finished by chiseling, Xyron 2-25 was used to build up the 1" wide and 1" deep groove. Weld deposit was dense, smooth, and machinable, free from cracks and porosities. Machining produced smooth finish shown in Fig. B.

Original cause of crack, excessive keyway play, was eliminated by building up the keyway with EutecRod 185FC, Bronzo-Chrom alloy rod that work hardens to BHN 200 and is fully machinable.

Fig. B

Wheel hub has been returned to service; welds have shown high resistance to wear and provided trouble free operation. **(A-44)**

VALVES RE-FACED WITH EUTECTRODE 680 AC-DC SHOW AMAZING WEAR

EutecTrode 680 AC-DC has again demonstrated its amazing strength, long wear, and high heat resistance. Conventional high heat welding materials were previously used to re-face valves on compressor engines used in gas line pumping stations of an Arkansas pipe line corporation. After 2 to 3 months, conventional hard-faced overlays were cracked, pitted, and burnt out.

Eutectic's District Engineer recommended patented EutecTrode 680 AC-DC, all-purpose, high tensile electrode for very high alloy and carbon steels. Over one dozen valves were overlayed with a one-pass coating of EutecTrode 680 AC-DC. After one year's service, compressor engines were dismantled. Not one valve repaired with EutecTrode 680 AC-DC showed any trace of pitting or cracking. Valves were returned to use and the company expects at least another year's service from them. Ultimate tensile strength of EutecTrode 680 AC-DC is 120,000 psi. It can be used for all "problem" steels requiring the best possible weld qualities. **(A-42)**

ROLLS ROYCE ENGINE SAVED BY EUTECTRODE 2101

A collector of antique automobiles thought he would not be able to re-build the engine of a 1916 Rolls Royce because no replacement part was available for a badly corroded aluminum head. Then Eutectic's District Engineer suggested repair with EutecTrode 2101, whose exclusive "Frigid Arc" extruded flux coating produces a "Low Amp," easy

to control arc. Deposits of this patented, highest strength aluminum electrode are smooth and dense, without spatter and porosities caused by conventional high heat electrodes.

After cleaning and preheating the head, the Rolls Royce owner used EutecTrode 2101 to build up corroded areas. EutecTrode 2101 permitted rapid deposits at lowest amperages with amazing arc stability. Welds have shown close color match and perfect corrosion resistance. Joints of EutecTrode 2101 are up to three times stronger than joints of conventional high heat aluminum electrodes. **(A-43)**

Eutectic Warehouse—Service Centers
446 Northside Drive, N. W., Atlanta 18, Ga.
2204 Irving Boulevard, Dallas 7, Texas

Eutectic Welding Alloys Corporation
40-40 172nd Street, Flushing 58, N.Y.

Gentlemen:

I would like further free information on the following:

☐ A-41 ☐ A-42 ☐ A-43 ☐ A-44

☐ **Free 170 page pocket Welding Data Book.**

Name_____

Address_____

City_____ State_____

EUTECTIC WAREHOUSE—SERVICE CENTER • 446 NORTHSIDE DRIVE, N.W., ATLANTA 18, GA.
EUTECTIC WAREHOUSE—SERVICE CENTER • 2204 IRVING BOULEVARD, DALLAS 7, TEXAS

To keep corrosion from "calling collect"—
Pacific Telephone & Telegraph Company used Wrought Iron Pipe

This radiant heating system, serving 22,500 square feet of floor area in Pacific Telephone & Telegraph Company's new warehouse at San Leandro, California, is an excellent example of the Company's insistence on durability. More than 16,300 feet of corrosion-resistant wrought iron pipe was used to safeguard the system against premature failure and costly repair.

The system, planned and designed by PT&T's Engineering Department, features some interesting construction details employed to protect the floor against damage from heavy fork-lift trucks and impact caused by bouncing reels of cable. After the 10-inch structural slab was poured, wrought iron pipe coils were laid in place. Over the pipe coils, a wire mesh was stretched to strengthen the concrete "topping" slab, and contribute to more even heat distribution. Then the pipe and mesh were covered with 3 inches of concrete. A metallic floor hardener was applied to the surface.

Architects for the project were Thomsen & Wilson, San Francisco. The system was designed by Harry S. Haley, San Francisco Consulting Engineer, in collaboration with Pacific Telephone & Telegraph Company engineers. The installation was made by Scott Co., Bay Area Mechanical Contractors.

Wrought iron pipe is ideally suited for this service because of its ease of installation, dependability in service. It takes short radius bends, without springback. It produces sound welds, free from pin-hole leaks. Its uniform structure assures sharp, full-depth threads. And because of its mechanical strength, wrought iron pipe withstands damage during installation. In service, wrought iron stays on the job longer, costs less per year.

Our bulletin, *Wrought Iron Pipe for Radiant Heating*, gives complete details, documents service records. Write for a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. International Division: New York, N. Y.

Available throughout the world

BYERS *Wrought Iron Tubular and Hot Rolled Products*

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS

other facilities they may serve. Also, hydrostatic tests indicate that when the new flange is properly employed the joint is capable of withstanding approximately three times the pressure it could contain if the taper was omitted.

The new flange is rated at 125 lb for water, oil and gas service. It matches 125 lb cast iron flanges and valves made to ASA B16.1, and the bolt circle and drilling are the same as employed for ASA 150 lb standard steel flanges.

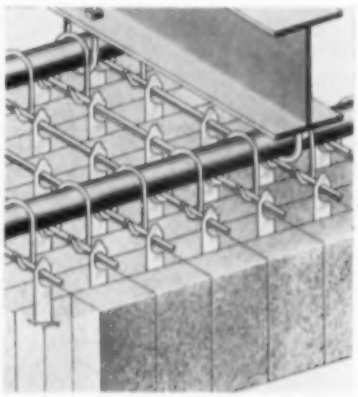
The new flange is expected to be widely employed in connecting lightweight welded piping to cast iron valves, centrifugal and reciprocating pumps and compressors, gasoline and diesel engine manifolds and other equipment. It wil be particularly useful to designers of gas distribution, fuel oil, water, refrigeration and similar low pressure systems.

Portable pH Recorder

B-3 Portable, self-contained, pH measuring and recording instruments requiring no external power supply are now available from **Bristol Co.**, Waterbury 20, Conn. for field surveys of stream pollution, waste-treatment plant effluent, and industrial water supplies, as well as in-plant studies at locations where a permanently mounted pH recorder is not desired for any reason, or where power is not available.

The new device consists of two units: a Bristol Model 524 pH recorder and a Beckman N-2 amplifier. This equipment will cover the total pH range of 0-14 in two partial ranges of 0-8 and 6-14. Selection is by means of a switch located on the amplifier. The recorder uses carbon-coated 8-inch diameter charts, and makes a record with a vibrating-type stylus. The chart drive can be set to rotate the chart in either 1 hour or 24 hours, depending on the application.

The two units together weigh less than 50 lb, and are compactly arranged for easy transport from one location to another.



Suspended Insulating Refractory Arches & Walls

B-4 A new practical suspension for insulating refractory walls and arches is announced by the **Geo. P. Reintjes Co.**, 2515 Jefferson St., Kansas City 8, Mo. The new arch uses a stainless steel supporting clip, one end of which is impaled between a pair of brick. The other end of this support is so designed as to hang over a rod much the same as clothes are hung on a line.

The opposing faces of the bricks are dipped in air-setting high temperature bonding cement before impaling the clips and then hung in pairs on prespaced rods. The clips extend beyond the refractories and are of sufficient length so that insulation of suitable thickness can be applied. The supporting rods in turn are supported from tubing on approximately 18" centers.

The suspended insulating refractory walls, also developed by the Geo. P. Reintjes Co. are similarly supported. The bottom row of the tiles rests on the horizontal leg of an angle which has been previously attached to the vertical column. Rods at suitable intervals, are fastened to these angles. The wall tiles are then laid in a manner similar to the building of gravity walls.

Stainless steel anchoring supports are hooked over the rods. Their inner ends are impaled in the brick. The sectional suspending of the wall is accomplished by spacing the supporting angles 2' to 4' apart, and having offset expansion joints occurring at the support angles.

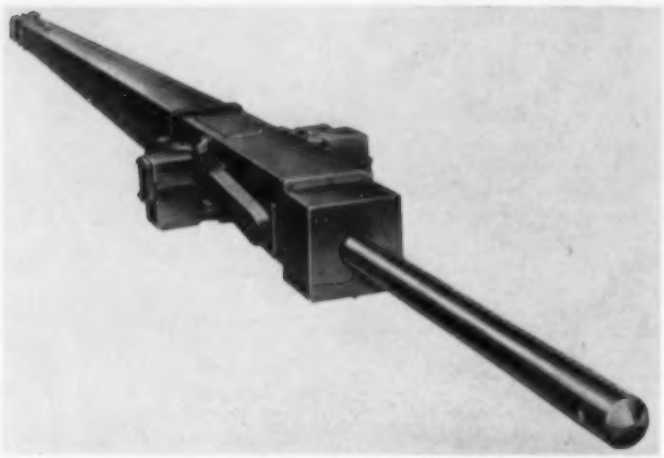
With this design the vertical supports, with exception of the impaled stainless steel anchors, are located outside of and are spaced away from the refractories. Insulation, either plastic or block, can be readily applied to the outside of the wall. By using 3" brick, standard insulation blocks of 6" width can be installed without cutting.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Industrial Vacuum Cleaner

B-5 A new improved Model 500 BP wet and dry pick up industrial vacuum cleaner is announced by **The Ace Co.**, Box 1212, Ocala, Florida. The new model features a by-pass motor for positive protection against moisture on water pick up work. Weight is only 45 lb.

Equipment, Supplies & Methods (Continued)



Retractable Soot Blower

B-6 The new Vulcan T-30 long retractable soot blower, developed by **Copes-Vulcan Division,** Blaw-Knox Company, Erie 4, Pa., is designed for very wide furnaces and has been built for traverse travels in excess of 36 ft. It can use either air or steam, with nozzle pressures from 50 to 425 psig, as the blowing medium without change in equipment. Dynamic balancing of the nozzles prevents vibration and whip of the lance during operation.

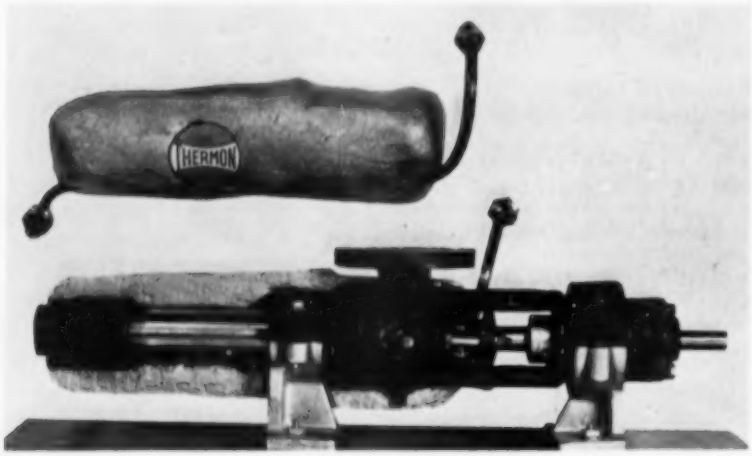
The Vulcan T-30 uses two electric motors, one to extend and retract the lance, and one to rotate it for a clean sweep of the tubes in all directions. Different speeds are available for both movements.

Rotation of the lance is always in the same direction. This, together with a change in retraction path, forms an infinite number of double-helix patterns of the blowing medium on repeated cycles to clean all surfaces uniformly and to minimize the danger of tube cutting.

The Vulcan alloy lance has exceptional strength at elevated temperatures. The stainless steel feed pipe is ground and polished to prevent binding and wear as the carriage slides along it, even with steam at 750 degrees F. The continually-changing path of the jets minimizes cutting or eroding. The feed pipe and lance have no hidden parts to clog or corrode, or to retard travel of the blowing medium, and the exposed stuffing box is easily repacked.

Motors are located away from hot furnace gases. Gear trains and controls are mounted away from the boiler walls and out of the path of the blowing medium. The low-friction chain drive needs little lubrication, is self-cleaning and is easily inspected and maintained.

Hard, crusty particles of soot or slag have no chance to adhere to the lance. A hardened-steel scraper plate, installed adjacent to the boiler wall, removes these deposits while the lance is retracting. The plate is designed for easy maintenance.



Removable Thermonized jacket as applied to a positive displacement pump. This type jacket may be made for the most complex equipment, offering the advantages of being removable for maintenance or adjustment—yet has excellent heat transfer characteristics.

Heat Transfer Medium

B-7 Thermon, a non-metallic plastic compound with highly efficient heat transfer properties, is available from **Thermon Manufacturing Co.,** 1017 Rosine St., Houston, Tex.

It is applied in a viscous paste form over either conventional steam traced or thermal electric systems, working equally well for heating or cooling systems. When cured to cement-like hardness, it bonds itself to the coils and equipment to form an unbroken thermal connection. It utilizes the entire surface of the tracer tubing and conducts this heat to the surface to be heated, or away from the surface to be cooled.

Thermon has been tested in laboratory kilns in temperatures up to 1700 F and is currently being used in systems up to 750 F in alternate hot and cold service without any signs of cracking, spalling, degradation, or other ill effects. In addition to its heat transfer properties, it has excellent mechanical and thermal shock resistance with linear shrinkage of less than one percent.

Thermon may be used wherever expensive steam jacketing systems are ordinarily employed and in numerous cases where steam jacketing is impossible, with a savings of up to 75%. It may be applied to new or existing equipment.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Inside Story on POWELL
PRESSURE SEAL VALVES

Pressure seal valves may appear similar on the outside. However, the Powell Pressure Seal Valves are quite different in design and in manufacture. And the inside story on Powell Pressure Seal Valves is that every valve has PERFORMANCE VERIFIED.

Only the finest materials are used in Powell Pressure Seal Valves, and painstaking quality control is rigidly enforced through each step of manufacture. For example, every machining operation is accurately gauged. All parts are thoroughly cleaned and degreased and thoroughly inspected.

Because of Powell's painstaking quality control, plant shutdown through valve failure is practically unknown. Records from power and industrial plants the world over prove it.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our COMPLETE quality line which has PERFORMANCE VERIFIED.

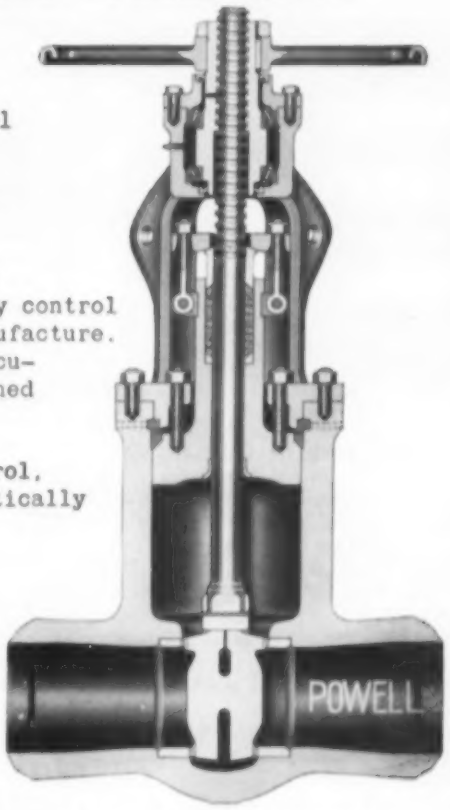


FIG. 11303 -- (Sectional) 1500-Pound Pressure Seal Steel Gate Valve

Fig. 1314-A -- 1500 Pound Integral Bonnet Steel "Y" Valve.

FIG. 11365 -- 1500-Pound Pressure Seal Piston Guided Horizontal Lift Check Valve

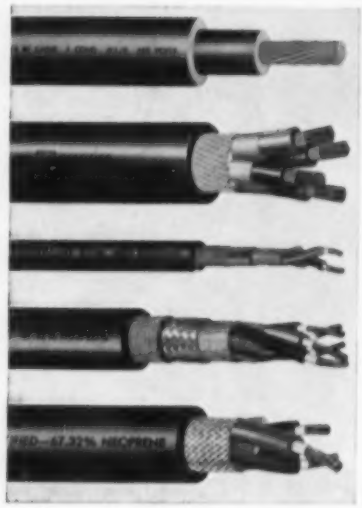
PERFORMANCE PV VERIFIED

The Wm. Powell Company, Cincinnati 22, Ohio . . . 111th YEAR

POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES

Equipment, Supplies & Methods (Continued)



Electrical Wires & Cables

B-8 Several new types of wires and cables have been developed by **Western Insulated Wire Co.**, 2425 East 30th St., Los Angeles 58, Calif. All of the recent developments are described in Western's new Bronco 66 brochure.

Two kinds of Type U.S.E., Style RR nonmetallic-sheathed **600 volt cable** is being offered under the Bronco label. One kind is suitable for direct burial in the earth. The other is a general purpose cable designed for raceways, ducts, or open wiring. Both kinds are available with either a solid single conductor, sizes 14 AWG through 8, or a stranded single conductor, sizes 14 through 4/0.

Bronco 66 Certified Type SO Shielded Cords are now made with two, three, or four conductors, sizes 18 through 10. The Bronco 66 **Shielded Control Cables** are made with five, six, seven, eight, ten, or twelve color-coded conductors in sizes 18 through 14.

Some of the most severe operating conditions **portable cords and cables** face are met with when used on retractable take-up reels, such as on foundry sand cutters, lifting magnets, cranes, and mine drills. To greatly extend the life of power lines used under these circumstances Western Wire has designed and is manufacturing special cords and cables which have acquired the unofficial designation Type "P & R." The Bronco 66 Certified Type SO "P & R" Cord is made in sizes 18 through 10 with two, three, or four conductors. The Type W "P & R" Cable is made in two and three conductor round, sizes 8, 6, and 4, and as a two conductor flat twin parallel cable, sizes 8 through 1. A special reenforcing braid of high tensile cotton yarn over the assembled conductors and under the jacket greatly extends the flex-life of these cords and cables.

Six hundred volt control cables for stationary installation in important control circuits have been added to the Bronco 66 Certified line of **portable control cables.** The stationary control cables are available from stock in AWG sizes 14, 12, and 10 with from two to twenty-four conductors. Conductors are coated, stranded copper. Buna Rubber insulation on each conductor is protected by a 1/64" color-coded Neoprene jacket. This jacket protects the singles from heat, oil, and ozone near terminals. A cotton wrap reenforcement over the assembled conductors permits free stripping of the Bronco 66 Certified outer Neoprene sheath.

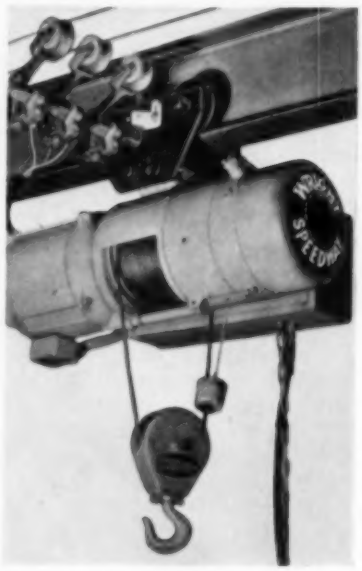
All Stainless Steel Temperature Regulator

B-9 Designed to withstand the corrosive effects of certain fumes, gases, acids, and chemicals, a new stainless steel temperature regulator is now offered by **Fulton Sylphon Division** of Robertshaw-Fulton Controls Company, Box 400, Knoxville, Tenn.

The new regulator, called the No. 11061-R, was developed mainly for use in chemical plants. Other applications are in plating rooms and in processes where ammonia vapors are present. It is also recommended for exposed locations.

In standard models of this control the entire upperworks are of stainless steel. Available in sizes from ¼" to 4", and in temperature ranges between 20 F and 455 F, the regulator requires no external power source, such as compressed air, water or electricity to function efficiently.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17



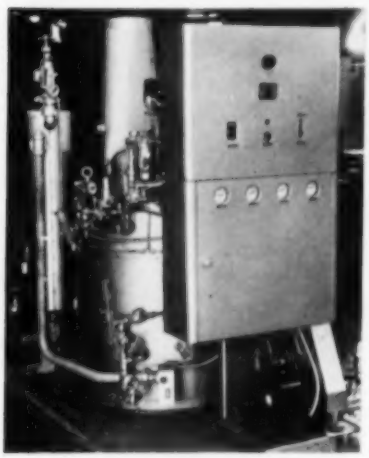
Two-Speed Electric Hoist

B-10 A new Frame 1, 2-speed Speedway Electric Hoist, equipped with fractional horsepower 1800/450 rpm motors, providing a fast lifting and lowering speed and a slow, ¼ normal speed, is being manufactured by the **Wright Hoist Division, American Chain & Cable Co., Inc.**, York, Pa.

The housing of these hoists is designed so that the side and end covers can be quickly unscrewed for the servicing of exposed parts in a matter of minutes. Two easy adjustments of a set screw are all

that is required to compensate for brake lining wear.

This Frame 1 line, available in parallel mounting, cross mounting, hook mounting and rigid or bolt mounting, utilizes totally enclosed NEMA specification motors for operation on ac or dc.



Package Steam Generator

B-11 A new Vapor Modulatic steam generator Model 4615, rated at 60 BHP, which produces 400 to 1750 lb/hr, from 60 degree feedwater at 75 to 300 lb steam pressure is announced by **Vapor Heating Corporation,** 6420 West Howard St., Chicago 21, Ill.

This new generator, with only 99 sq ft of heating surface, develops 200 lb pressure in two minutes from cold water. Automatic controls cause the unit to cycle ON and OFF and change the volume of steam produced to meet a changing steam demand, without a man making any adjustment. Vapor's specially designed servo-water-bypass-control carefully meters the fuel, feedwater and combustion air, so that this steam generator produces steam at about 80% efficiency at all levels of output. The working steam pressure may be changed from 75 to 300 psi by turning one control.

Overall dimensions are 84" long, 48" wide, 70" high or about ¼ the size of conventional boilers of the same output. Two design features are claimed to make this possible: (1) the pressure atomized fire in this steam generator releases considerably more heat per cubic foot of combustion space than conventional boilers; and (2) the patented 337 ft long steel coil is designed

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adds years of life to Iron or Steel

Nothing protects iron and steel from rust better than zinc. And nothing applies zinc better than hot-dip galvanizing.

Our modern equipment assures small, tight spangles . . . smooth, uniformly heavy coats of zinc . . . no burrs or fins! A tough, long-lasting barrier against rust and corrosion.

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ONE OF THE SOUTH'S LARGEST HOT-DIP GALVANIZING TANKS

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so that hot gasses, from the fire, wipe over and around the coils so as to transfer heat efficiently to the water being pumped through the coils under pressure, turning the water into steam. A steam separator removes excessive moisture and water treatment particles from the steam so that 99% dry, clean steam is directed through the stop valve to the steam line.

Three types of burners are available, one for No. 2 fuel oil, one for natural gas and a combination burner for oil or gas. Fuel may be changed by flipping one switch, no parts need to be changed out.

There are several protective safety controls such as: the steam temperature limit control a low water cut out, electric eye, safety valve, motor overload cut out, atomizing steam or air combustion switch cut out and an excessive water pressure relief valve are all built into the machines, which are constructed in accordance with ASME, Hartford and Underwriters specifications.

Each 4615 Vapor Modulatic steam generator is a complete package which includes a 3 hp electric motor, blower, feedwater pump, steam separator, fuel pump, panel mounted controls all mounted on a steel base.

No special building or walled-in area is necessary as these units cannot have a steam explosion because there is no reservoir of water heated under pressure.

Lubricated Pillow Blocks

B-12 The **Rockwood Pulley Manufacturing Company,** 20 Crosby St., New York 13, New York, has announced the Pollard "Self-Lube" pillow block line.

This new line of pillow blocks, flange units and take ups, available in normal and medium duty series in sizes from ⅛" to 4", offers entirely new advantages, and several features not found in ordinary ball bearing transmission units.

All Pollard bearings are sealed for life, eliminate need for continuous lubrication and other disadvantages and hazards of exposed bearings. All units are self-aligning, as well as self-sealing. "Self-Lube" housings and bearings are also interchangeable with most all standard makes.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

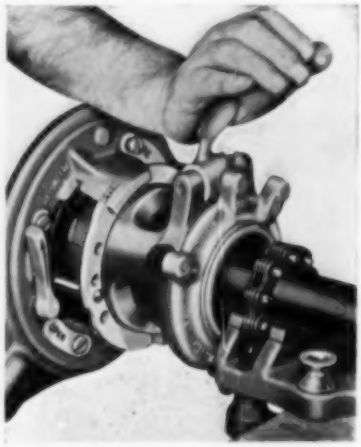
Magnetic Magnifying Glass

B-13 A 6-power magnifying glass, mounted in a transparent housing and fitted with Alnico magnets, is being manufactured by **Magnaglass Mfg. Co.,** 12 Liberty St., Fredonia, New York.

Unit mounts instantly to gauges for quick, easy and accurate readings of fine calibrations. This frees the hands to manipulate the gauge or piece being checked. Transparent housing permits full vision of calibrations from any angle. Housing is shatterproof and the lens is set ⅛" below the top so as to reduce chances of receiving scratches. Magnaglass costs approximately $3.00.

Pipe Threader Workholder

B-14 A new True-Centering Workholder has been announced as an improvement on the Ridged 65R pipe threader. This new TC Workholder guarantees threads which are always



straight and true, according to the manufacturer, **The Ridge Tool Company,** Elyria, Ohio.

Even if pipe is over or under size, the 65R with the new TC Workholder assures a perfect thread every time because all three workholder jaws close at one time. User simply pre-sets the workholder cam plate to desired pipe size, which adjusts all three jaws in a single mechanical action. When threader is on the pipe, workholder jaws tighten as this 3-jaw action is continued by pump of palm of operator's hand on forged cam lever. Easy adjustment for drip threads.

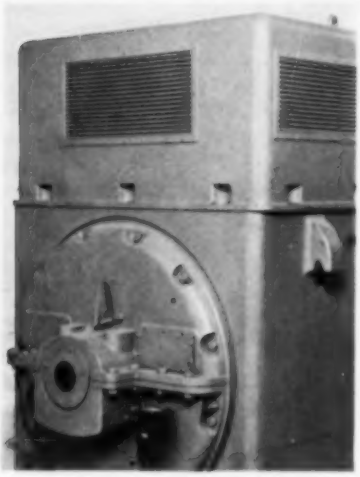
The new TC Workholder is said to end all trouble with crooked or lopsided threads. Owners of previous style 65R threaders can enjoy this improvement by buying the new TC Workholder and putting it on present 65R die stock, which is jam-proof, threads 1" to 2" pipe or conduit with one set of dies and permits size changes in only eight seconds.

Blade Sharpening Service

B-15 A new method of sharpening power hacksaw blades on special precision machines is announced by **Peerless Tool, Inc.,** 38 Peck St., North Attleboro, Mass.

The new service is claimed to give new blade life even on the 3rd and

4th regrind for 1/3 the cost of a new blade. Process does not affect set or temper. Processor claims that thousands of these resharpened blades are successfully cutting stainless, titanium and other metals in job and large production shops.



Low Sound Level in New Boiler Feed Pump Motor

B-16 A new 3600-rpm boiler feed pump motor specially designed for personnel comfort has been announced by **General Electric**, Schenectady 5, New York.

High frequency sound levels are reduced by sound absorbing material and baffling, while low frequency sound is quieted through a stiffening of the stator frames.

Developed by the company's Medium Induction Motor Department, the new design, already available in 1000 hp and up, also includes features for reduced maintenance, easier inspection and longer motor life.

Inspection of bearings and stator windings is made easier by the horizontally split cast iron end shields and air deflectors, and by use of a removable "top hat" section and removable cover plates on each side of the motor near the base.

Feeler gage openings provided at 90 degree intervals on the end shields make it easier to measure air gap.

Maintenance needs have been substantially reduced through use of a new bearing sealing system. Static air pressure is maintained on both sides of the bearing to further eliminate oil leakage.

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The "Pressure-Sealing" V-Ring Packing

SEATS AUTOMATICALLY

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KEEPS EQUIPMENT RUNNING SMOOTHLY. CUTS MAINTENANCE

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BASIC MATERIAL COMBINATIONS FOR VARIOUS SERVICES

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A SIZE FOR EVERY ROD & STUFFING BOX

Ask your BELMONT *Packing Distributor or write for catalog.*

Scientifically designed to make the pressure seal itself, BEL-VEE Rings expand toward the rod and stuffing box wall, on the power stroke or with increased pressure, to automatically form the pressure seal.

On the return stroke, or with pressure relaxed, BEL-VEE Rings contract from the rod for free movement with minimum friction.

BEL-VEE Rings are individually molded in a number of basic material combinations. Offered in sets for pressures to 6000 psi. for sealing reciprocating rods of pumps, engines, compressors, hydraulic equipment and valve stems—handling water, oil, solvents, steam, air and gas.

BEL-VEE Rings are made in practically every rod and stuffing box size.

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BELMONT

New Catalogs for the Plant Engineer

FOR FREE INFORMATION—Circle code number on page 17 or 18

M-17—Electrical Systems—24 page book, "Nepco-Lok Interlocked Armored Cable, Supports and Fittings," contains photographs and specific descriptions of the various types of armored cables available for voltages up through 15,000 volts, single and multi-conductor. Included are correlated listings in table form of the most frequently used dimensional data, coordinated support system and fittings recommended for use with the cable, and charts pertaining to the fittings showing cable range, size requirements, catalog numbers and dimension in inches. — NATIONAL ELECTRIC PRODUCTS CORPORATION, Gateway Center, Pittsburgh 22, Pa.

M-18—Industrial Oil Burner—4 page bulletin describes new industrial oil burner which is able to effect a 30% saving in fuel costs by using heavy No. 5 oil. Includes detailed specifications. — INDUSTRIAL DIVISION, YORK-SHIPLEY, INC., 500 Jessup St., York, Pa.

M-19 — Fire-Resistant Hydraulic Fluids—16 page booklet, "Ucon Hydrolubes Spell Safety," describes the company's new CP hydrolubes, gives its physical properties, discusses the advantages and limitations of water-base, fire-resistant hydraulic fluids, and contains complete information on the installation, use and maintenance of Ucon Hydrolubes. — CARBIDE & CARBON CHEMICALS COMPANY, 30 East 42nd St., New York 17, N. Y.

M-20—Lubricated Plug Valve — 28 page catalog, Section 5 of Reference Book 39, shows 100% pipe area, venturi, round port, and diamond port Homestead Lubricated Plug Valves in a variety of metals for 150 lb steam working pressure, 200 lb oil-water-gas, and A.S.A. 150 and 300 lb classes. Complete with engineering dimensions it also shows different types of power operators for valves, in addition to complete lines of lever operated, and worm and gear operated valves.—HOMESTEAD VALVE MANUFACTURING COMPANY, Corapolis, Pa.

M-21—Lubricant Additive—12 page bulletin Lu-6 explains Moly-Sulfide's function as a lubricant additive and describes commercial uses. Content and results of field and laboratory tests for each application are presented. Gives technical information on chemical and physical properties. — CLIMAX MOLYBDENUM COMPANY, Dept. L, 500 Fifth Ave., New York 36, N. Y.

M-22—Storage Problems?—Bulletin on the Flexangle Universal Slotted Angle System gives a novel approach to storage and other construction problems with the intention of saving time, space, money and labor. Describes some of the varied applications, shows how exceptionally rigid, fire resistant, space saving structures can be built without drilling, welding, or painting, and with a minimum of measuring, and describes the complete reusability of Flexangle components and their ease of storage in very little space. — FLEXANGLE CORPORATION, 278 Park Road, West Hartford 7, Conn.

M-23—Annunciator Systems—Catalog 100B containing 32 pages describes the complete line of standard, integrated Panalarm Annunciator Systems for industry. Discusses company facilities, annunicator function and general features, illustrates typical industry applications, present operating sequences, enclosures, mechanical specifications, technical data and performance features of specific types of the systems.—PANALARM DIVISION, PANELLIT, INC., 7401 North Hamlin Ave., Skokie, Illinois.

M-24—Wire & Cable—40 page catalog-type bulletin A.I.A. File No. 31-C-671 discusses the composition, tested "in use" properties and suggested applications of "Type RR Rubber Insulated-Neoprene Sheathed Non-Metallic Cables." Provides data on size, strand construction, insulation sheathing, outer diameter, shipping weights and current carrying capacities.—NATIONAL ELECTRIC PRODUCTS CORP., Gateway Center, Pittsburgh 22, Pa.

M-25—Packless Valves — 22 page Catalog "F" describes in detail a complete line of packless valves for applications involving hazardous liquids and gases and uses in nuclear energy installations. Includes 20 cutaway views of different models, data on specifying and ordering, and charts concerning the application and selection of these valves. — FULTON SYLPHON DIV., ROBERTSHAW - FULTON CONTROLS CO., Box 400, Knoxville 1, Tenn.

M-26—Magnetic Magnifying Glass—Data Sheet describes Magnaglass, a 6 power magnifying glass mounted in a transparent housing and fitted with magnets that cling to any magnetic metal. In addition to simplifying scale reading, it is helpful in checking scribed lines and centers and in detecting surface defects, cracks and flaws on die surfaces. — MAGNAGLASS MFG. CO., INC., 12 Liberty St., Fredonia, N. J.

M-27—Motor Selector—12 page Bulletin B-2103-1 gives full information on how to select a-c motors for specific applications. Includes speed-frequency relationship, NEMA design classes, torque characteristics, NEMA current and torque valves, frame selection tables, and dimension charts and mechanical modifications for all frame sizes from 182 to 6085. Pictorial glossary of motor enclosure terminology also included.—RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Rd., Cleveland 10, Ohio.

M-28—Ventilating & Exhaust Systems—12 page brochure on corrosion-proof ventilating and exhaust systems covers thermoplastic corrosion-proof centrifugal fans, ducting and fittings and hoods. Discusses polyethylene and non-plasticized polyvinyl chloride centrifugal fans. More than three dozen illustrations are included.—AMERICAN AGILE CORP., Box 168, Bedford, Ohio.

M-29—Internal Gear Rotary Pumps—Folder gives thumbnail descriptions of five new series of internal gear rotary pumps and gives salient features. Folder is also a return card facilitating easy request for company's main line catalog and review of activities. — WAYNE PUMP CO., 214 Tecumseh St., Fort Wayne 4, Indiana.

M-30—Positive Displacement Pump—Two brochures describe the Tri-Rotor pumping principle, where the pumps may be used, points of superiority and a brief description, along with illustrations, of the models available. Special features of the pumps include by-pass relief valve, automatic volume control, manual flow control, pressure regulating control and pulsation absorber. — YALE & TOWNE MANUFACTURING CO., Stamford, Conn.

M-31—Pad Type Machinery Mounts—Bulletin K2D describes vibration and noise absorbing machinery mounts utilizing Elasto-Rib. Gives complete information on properties of Elasto-Rib and Universal Dampers, incorporating this hi-efficiency material as the isolation medium. Construction and installation diagrams of these dampers, dimension and loading capacity tables are included, along with pricing information and selection data.—KORFUND CO. INC., Long Island City, New York.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

News (Continued)

(*Starts Page* 12)

Conoflow—Ga. & Tenn.

The Lewis M. Crowe Company, Atlanta, Georgia, has been appointed sales representative for **Conoflow Corporation.** The Lewis M. Crowe Company will be exclusive sales agency for ConoControls in the State of **Georgia** and the **eastern section of Tennessee.**

Lewis M. Crowe, Jr., principal of the organization, possesses a wide background of experience in the fields of instrumentation and controls. Before founding his own agency in 1954, Mr. Crowe was employed as a sales engineer for a manufacturers representative in control valves and instruments. Previously, he was associated directly with several control equipment manufacturers in a sales capacity. As all of these positions were in the Atlanta area, Mr. Crowe is well known in this vicinity.

Bituminous Coal Research

Dr. Richard A. Glenn, research chemist, has been promoted to supervising chemist according to an announcement by Dr. A. A. Potter, president of **Bituminous Coal Research, Inc.** Dr. Glenn, under Dr. H. J. Rose, vice president and director of research, will directly supervise research projects at the **Pittsburgh** laboratory.

Dr. Glenn, a native of McKinney, Tex., is a graduate of North Texas State Teachers College in chemistry, and he received both his masters and doctor of philosophy degrees in chemistry from the University of Texas.

pd offers 5 basic boiler components

P-D makes it easier, safer and quicker when you sign that order for steam generating auxiliary equipment. There's no time delay; no engineering problems; no piece-by-piece delivery from different sources.

Prat-Daniel's *single responsibility* guarantees equipment of balanced design . . . matched for ease of assembly, unmatched for peak performance. Each component is built to complement the other, with the integrated unit providing highest efficiency for your system.

Prat-Daniel offers years of specialized experience in the design and development of *Forced Draft Fans, Air Preheaters, Tubular Dust Collectors, Induced Draft Fans* and *Fan Stacks* for industry.

Contact The Thermix Corporation, Project Engineers for Prat-Daniel, for your requirements. Ask for data sheets on P-D equipment.

Project Engineers
THE THERMIX CORPORATION
GREENWICH, CONN.
(Offices in 38 Principal Cities)
Canadian Affiliates: T. C. CHOWN, LTD., Montreal 25, Que.

Designers and Manufacturers
PRAT-DANIEL CORPORATION
SOUTH NORWALK, CONN.
POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks

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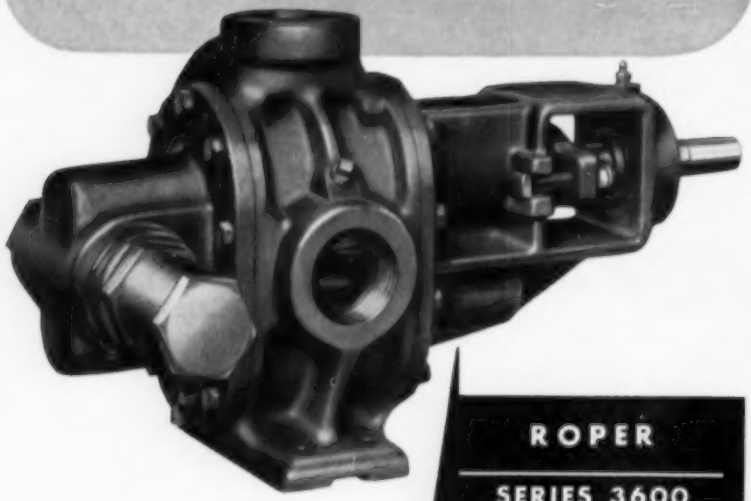
STANDARD PUMPS
FOR PROCESS INDUSTRIES

All-iron and All-iron with Bronze Bearings



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SERIES 3600
General Purpose Pump

40-300 G.P.M.
TO 90 P.S.I.

Designed for a broad range of clean liquid applications, the Roper Series 3600 General Purpose Pump is widely recognized for its highly dependable performance, low maintenance characteristics, and ease of installation • Roper standard fitted models have cast iron housings, hardened iron gears, 4 high-lead bronze bearings and precision-ground steel shaft. All iron models, with hardened iron bearings, are also available for specific needs. All models are available with or without adjustable relief valve in mechanical seal or packed box construction • The Roper representative in your vicinity will be glad to go over your requirements with you, whether you are interested in pumps for replacement or for original equipment in new processing operations. Call him today!

ROPER
Rotary Pumps

Send for Catalog today!

GEO. D. ROPER CORPORATION
432 Blackhawk Park Avenue, Rockford, Illinois

News (Continued)

Control Equipment—Ala.

Control Equipment Company, Inc., Manufacturers' Representatives, Atlanta, Ga., announce the election of **J. P. Cantor** to the position of Vice-President in charge of their Alabama office with headquarters in **Birmingham.**

Mr. Cantor, formerly Cleveland District Manager for the Wheelco Division of the Barber-Colman Company, Rockford, Illinois, is an experienced sales engineer in the field of instrumentation. Prior to his Cleveland assignment he spent 17 years with the New York Edison Company and the Wheelco Instrument Company in New York.

Control Equipment Company, Inc., represent, among others, Panellit, Inc.; Fielden Instrument Division of the Robertshaw-Fulton Controls Co.; DeZurik Shower Co.; Continental Equipment Co.; Automatic Temperature Control Co.; and the Hammel-Dahl Company, Providence, R. I.

Floyd White & Charles Little

Sales Promotions at Vulcan Steel Container

Two appointments in the Sales Department of **Vulcan Steel Container Co.,** Birmingham, have been an-

nounced by Gordon D. Zuck, Company President.

Floyd A. White, Jr. was named Sales Manager of the Southeastern Region and will have charge of sale of pails and drums and supervise District Sales Offices and Warehouses in Tennessee, Georgia, North and South Carolina, Virginia and Florida.

Charles B. Little was named Sales Manager of the Southwestern Region and will be responsible for sales and supervise District Offices and Warehouses in Louisiana, South Mississippi, Texas, Arkansas and Oklahoma.

Both men are well known throughout the South. They will headquarter at the company's main office and factory in Birmingham, Alabama. The company manufactures steel pails and drums in sizes from 1 through 20 gallon for chemical, paint, food and petroleum products.

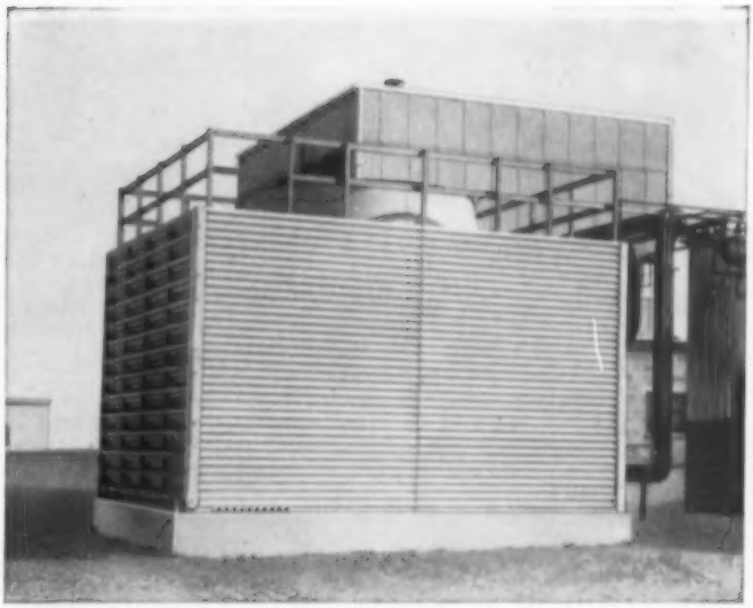
Peerless Pump—La. & Ark.

Announcement of the appointment of **Max H. Richter, Jr.**, of New Orleans, as sales engineer is made by B. A. Tucker, sales manager, **Peerless Pump Division**, Food Machinery and Chemical Corporation, Los Angeles, California.

Richter, who attended Louisiana State University, has been assigned to handle sales of the company's engineered vertical and horizontal pump lines in **Louisiana** and **Arkansas.**

Heating & Air-Conditioning Exposition—Chicago, Ill.

Applications are still being received from prospective exhibitors for the 13th International Heating & Air-Conditioning Exposition which is to be held in the International Amphitheatre of **Chicago, Illinois, February 25** through **March 1**, under the auspices of the American So-



Plant Engineers "Discover" the

Marley

Double-Flow Aquatower*

Ask a progressive plant engineer what intermediate-capacity cooling tower offers every performance and maintenance advantage of large industrial towers, and chances are 9 to 1 he'll say, "Marley's Double-Flow Aquatower"! This tower that combines big-tower performance with small-tower compactness is today "the hottest thing in cooling" for industrial services involving intermediate-gallonages.

Only the Double-Flow Aquatower gives you the many plus-performance features developed for huge Marley industrial towers—open distribution . . . extra-rugged structure . . . more-than-adequate fill, drift eliminators, and fan cylinders . . . Marley-designed fans and Geareducers . . . easy-access maintenance. And this complete cooling tower is a streamlined, space-saving unit for it is the *original low-silhouette* tower.

There just isn't anything like the Double-Flow Aquatower, and if you haven't yet "discovered" it, get in touch with your Marley Application Engineer in any of 55 cities. He'll show you the complete line in wood or steel structure with asbestos cement board casing, in single or multi-cell units. *Call him today or —*

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MARLEY

The Marley Company

Kansas City, Missouri

LOW TEMP LUBRIPLATE

* Best for Sub-Zero Lubrication

Highly recommended for general grease applications on all types of machines operating at very low temperatures. Remains plastic at temperatures as low as 70° F below Zero and has a Melting Point of 270° F. Possesses high film strength and is of a consistency that meets all requirements. Can be easily applied through grease guns or by other means of application. LOW TEMP LUBRIPLATE is waterproof and will protect automotive and other types of equipment against the unfavorable effect of salt or calcium chloride as used on highways during winter months.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

News (Continued)

ciety of Heating and Air-Conditioning Engineers—in conjunction with their 63rd annual meeting.

The Exposition, which promises to be one of the greatest displays ever projected by a single industry, already has more than 450 enrolled, representing a 15 per cent addition in space requirements which were anticipated. The exhibitors' list reflects the expansion that is taking place in heating and air-conditioning in residential, institutional and industrial fields. Heating and air-conditioning have become an integral part of the construction industry. They are developing inseparable ties with an increasing number of manufacturing industries. This dual affiliation accounts for a growth rate that defies any calculated expectancy of leveling off.

Alterations and innovations in product are occurring even more rapidly than in industrial organization. Hundreds of new products will be seen at the Exhibition for the first time.

Atlantic Steel—Atlanta

At a recent meeting of the board of directors of **Atlantic Steel Company** of Atlanta, Georgia, **Robert S. Lynch** was elected chairman and chief executive officer, and **Howard B. Johnson** was elected president. **Charles F. Stone**, board chairman since 1947, was named chairman of the Executive Committee. No other changes in officer personnel were made.

Mr. Lynch, a native of Vandergrift, Pennsylvania, is an alumnus of Ohio State University. He has been connected in various capacities with the American Sheet and Tinplate Company, United Alloy Corporation, and Republic Steel Corporation. He joined Atlantic Steel in 1944 as general superintendent. In 1946 he was made vice president, and in January, 1947, was elected president.

Mr. Johnson was born in Tallapoosa, Georgia, and is a graduate of Georgia Institute of Technology. He joined Atlantic Steel in 1933 as an accountant. He later became order department manager and was named assistant secretary in 1945, and vice president, finance and accounting, the following year. In 1949 he became vice president in

That's right sir, Southern Water Conditioning is the largest in the South . . . Serving just the South to assure better and faster service. Top personnel with more than 32 years experience in the field.

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★ **Zeolite Water Softeners**
Standard greensand, hi capacity greensand, synthetic gel, sulfonated coal, resin polystyrene, sodium and hydrogen ion exchangers, hot process

★ **Filters and Purifiers**
Sand — anthrafilt — quartz — activated carbon — taste and odor removal — condensate oil removal

★ **Modernized and Rebuilt Water Softeners**
Increased capacities of older units as much as 300% (depending on type of zeolite) standard valve nests — multiport valves — semi automatic and fully automatic

★ **Aerators and Degasitors**
Coke tray — slat tray — forced draft — induced draft for removal of iron — manganese — taste and odor — hydrogen sulphide — methane

★ **Process and Boiler Water Conditioning**
De-mineralizers — post treatments — zeolite — alkalinity neutralizers — split stream system — chemical treatment feeders. Misc. chemical treatments. Your inquiry survey made by competent personnel. Service after installation, periodic calls

★ **Domestic Softeners—all types**
Swimming pool filters, complete package units, Zeolite in stock, for immediate shipment

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St. Petersburg, Fla.

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☐ As one Southern gentleman to another Southern gentleman, I would like to receive your illustrated brochures.

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charge of sales and finance. He was elected to the board of directors in 1950 and in September, 1956, was named executive vice president.

Mr. Stone, although born in Chattanooga, Tennessee, has been a lifelong resident of Atlanta. A Georgia Tech graduate, he joined Atlantic Steel in 1910 in a sales capacity. He became general manager of sales in 1914, and in 1921 was named vice president. He was elected a director and president of the company in 1932 and was named chairman of the board in 1947. He is also a director of the Trust Company of Georgia and of the Continental Gin Company.

Atlantic Steel Company is Georgia's only steel mill, and one of the country's few wholly independent steel producers. It operates two electric furnaces in addition to open hearth facilities, and last month announced the completion of a new merchant bar and rod mill. This was the latest step in the company's $16 million post-war expansion and modernization program.

Lunkenheimer—Houston

The appointment of **Jack L. Green** as **Houston, Texas,** sales representative by the **Lunkenheimer Co.** of Cincinnati, Ohio, places an experienced man at the service of valve buyers, users and distributors in that territory.

Green succeeds Joseph A. Birkhead, who died last September.

A native of California, Green joins the Lunkenheimer sales staff following 13 years in sales during which time he covered the Rocky Mountain and Southwestern petroleum, power and other industries for the Republic Supply Co. and the Western Oil Tool and Manufacturing Co.

They needed pumping capacity

They needed pumping pressure

You can have capacity . . . or pressure . . . or both

You can meet an exceptionally wide range of pumping needs with just two types of Goulds pumps.

For volume pumping—33 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6400 GPM, heads up to 425 ft.

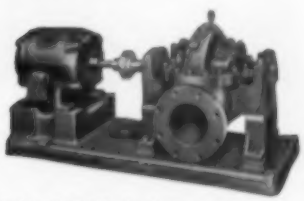
For great pressure—5 sizes of the Fig. 3305 two-stage pump provide heads up to 1000 ft., capacities to 1200 GPM.

All these *extra* features are *standard* on both groups:

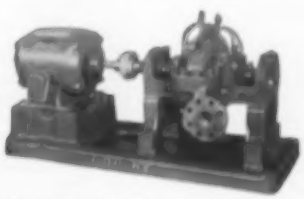
1. Bearing housings sealed against dust and moisture.
2. Renewable stuffing box bushings.
3. Die-formed stuffing box packing.
4. Cowl-type glands for use with quenching fluids.
5. Corrosion resistant gland bolts.
6. Stainless steel impeller rings.
7. Teflon water seal rings.

Because so many parts on these pumps are interchangeable—you can cut parts inventory in two or better.

For further information write for Bulletin 721.6 on the Fig. 3405; Bulletin 722.6 on the Fig. 3305.



Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

Goulds PUMPS INC. Seneca Falls New York

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PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

Standard & Double Extra Heavy
UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes 1/8" to 3"; 6000-lb. sizes 1/8" to 2".

ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

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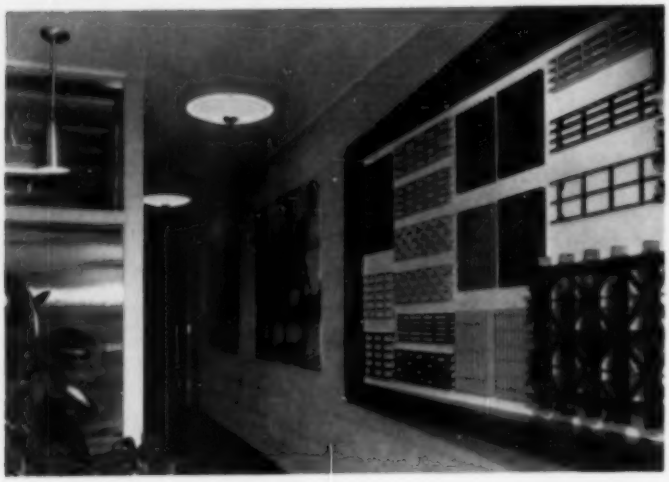
With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.

WRITE FOR CATALOG 56
Showing the Complete Catawissa line of Perfect Seal Products
CATAWISSA VALVE & FITTINGS COMPANY
950 MILL ST., CATAWISSA, PA.

News for the South & Southwest (Continued)



Visitors "Meet the Product" at Kerrigan

Before they reach the reception room, visitors to the general offices of **Kerrigan Iron Works, Inc.**, Nashville, Tennessee, "meet the product" in the entrance hall. A mahogany framed wallboard displays steel, stainless steel, riveted and aluminum grating; serrated, standard and close mesh grating and other steel flooring manufactured in Kerrigan's three plants.

Installation of these displays marks the completion of a year-long program of construction and expansion at Kerrigan. A 160 ft addition was made to the River Plant (Weldforged Grating Div.) and a new 2-story fireproof brick building provides space for the Greulich Bridge Flooring Div.

Rust Engineering Company's new office building—Birmingham

Rust Engineering—Ala.

With the completion of their new office building in **Birmingham, Alabama, The Rust Engineering Company** now has an engineering drawing room that is the largest of its kind in the South. All of the Rust's southern operations will be housed in these new quarters.

The building contains over 30,000 square feet of floor space which will accommodate an office force of 220 people. Estimated cost of the new Rust Building was put at more than $400,000.

B & W Vice President

S. T. Mackenzie has been elected a vice president of **The Babcock & Wilcox Co.** and placed in charge of the sales department of the company's Boiler Division, according to L. S. Wilcoxson, Vice President, Boiler Div.

Mr. Mackenzie was formerly sales manager of the sales department and his appointment fills a vacancy created by the retirement of **W. T. McCullough, Jr.**

Mr. Mackenzie was graduated from Lehigh University in 1924 and joined B & W as a sales engineer in its Philadelphia office in 1934. He became district manager of the Philadelphia office in 1947 and in 1951 was appointed sales manager of the Boiler Div., with headquarters in New York.

American Engr.—Sls. Mgr.

Appointment of **Fred R. Callowhill** as Sales Manager of its Power Plant Division has been announced by **American Engineering Company.** Callowhill has been associated with American Engineering since 1953 as Sales Manager.

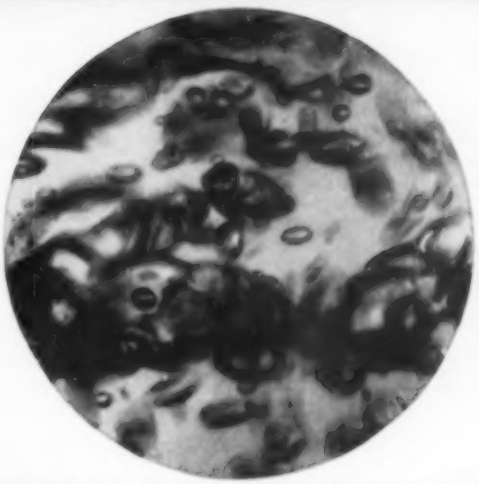
In his new position he will be

BEFORE CONCENTROL—Foaming of highly alkaline solution in glass test cylinder.

HERE'S PROOF:

CONCENTROL

CONTROLS FOAM AND BOILER WATER CARRY-OVER



AFTER CONCENTROL—Same solution after addition of 12 ppm of Concentrol Antifoam.

Where boiler water carry-over is caused by foaming due to high alkalinity and high proportion of dissolved solids in the water, Concentrol provides a low cost, effective method of chemical treatment and control. Supplied in liquid, powder or briquet form—to be fed continuously or in slugs to boilers—Concentrol is essentially a surface agent that causes breakdown of bubble film to prevent foam formation. Formulations of Concentrol can include organic sludge conditioning agents and other water treatment chemicals for boiler treatment as well as antifoam. Fast acting and resistant to hydrolysis or breakdown under normal boiler temperatures and pressures. Eliminates need for costly pre-treatment of water and high blow-down rate.

Write for NAME OF BIRD-ARCHER WATER TREATMENT ENGINEER NEAREST YOU.

BA 607

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WATER TREATING ENGINEERS

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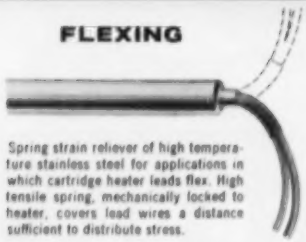
The Bird-Archer Co. of California, 881 Mission St., San Francisco

Offices also in Canada and Mexico

TAKE YOUR PICK!

Special Chromalox features solve 3 spot heating problems

FLEXING



Spring strain reliever of high temperature stainless steel for applications in which cartridge heater leads flex. High tensile spring, mechanically locked to heater, covers lead wires a distance sufficient to distribute stress.

MOISTURE

Moisture-resistant flexible brass conduit protects lead wires of cartridge heaters operating in presence of steam, water, oil and vapors. Also offers added protection from flexing, vibration and mechanical damage.

ABRASION

Flexible brass conduit protects cartridge heater lead wires against abrasion from other moving parts and from accidental mechanical damage. Safety factor where lead wires are exposed to machine operator.

FREE BULLETIN!

CHROMALOX ELECTRIC CARTRIDGE HEATERS

Get the full story. Call your Chromalox Representative or write today for Bulletin 850.

C-2101

Edwin L. Wiegand Company

7563 Thomas Boulevard • Pittsburgh 8, Pa.

News for the South & Southwest (Continued)

responsible for the sales of Taylor, Perfect Spread, Vibra-Grate and incinerator Grate Stokers through the company's district sales offices and representatives.

A graduate of the Drexel Institute of Technology in 1943, Callowhill formerly was with Cochrane Corp., and Penn Industrial Instrument Corp., also as Sales Engineer.

P. J. Ames | S. A. Creson, Jr. | K. P. Cox

G-E—Rome, Ga.

K. P. Cox and **S. A. Creson, Jr.** have been appointed traveling sales specialists for **General Electric's Medium Transformer Department** at **Rome, Ga.**

Their appointment by Cristopher T. Kastner, department manager of marketing, will extend the department's service to customers through the apparatus sales district.

Cox will handle load center transformer sales for all markets; Creson is assigned to medium transformer sales to industrial and REA markets; and **P. J. Ames**, medium transformer specialist for all markets for the past year, now will concentrate on utility sales.

G-E's manufacture of load center transformers was transferred last spring from the Power Transformer Department in Pittsfield, Mass., to the Medium Transformer Department at Rome. The plant produces a complete line of LC units of ratings from 300 to 7,500 kva.

FUTURE EVENTS of Engineering Interest

Feb. 3-5: 26th Annual Mid-Winter Conference, Public Utility Buyers' Group, **National Association of Purchasing Agents,** The Brown Hotel, **Louisville, Ky.** L. Glen Wiseley, Chairman, Public Utility Buyers' Group, National Association of Purchasing Agents, Michigan Consolidated Gas Co., 415 Clifford St., Detroit 26, Mich.

Feb. 25-Mar. 1: 13th International Heating & Air-Conditioning Exposition, **American Society of Heating & Air-Conditioning Engineers,** International Amphitheatre, **Chicago, Ill.** E. K. Stevens, President, International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Mar. 3-5: Southern Safety Conference & Exposition, John Marshall Hotel, **Richmond, Va.** 14 Southern states provide exhibit of safety items and will give 14 sectional programs on specific safety subjects. W. L. Groth, Executive Director, Box 8927, Richmond 25, Va.

Mar. 25 - 27: Silver Anniversary, **American Society of Tool Engineers,** Shamrock Hilton Hotel, **Houston, Texas.** Includes symposia on ceramic and plastic tooling, technical papers, and panels. L. S. Fletcher, 10700 Puritan Ave., Detroit 38, Michigan.

Mar. 25-29: 10th Western Metal Congress, Ambassador Hotel, **Los Angeles, Calif.** Will include technical sessions by ASM, Los Angeles Section of American Welding Society, Society for Non-Destructive Testing & American Institute of Mining & Metallurgical Engineers. A titanium conference will also be included. American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio.

Apr. 8-10: ASME Spring Meeting, Hotel Dinkler-Tutwiler, **Birmingham, Ala.** The American Society of Mechanical Engineers, 29 West Thirty-Ninth St., New York 18.

Apr. 8-12: Annual National Spring Meeting, **American Welding Society,** Hotel Sheraton, Philadelphia, Pa. Technical papers on recent research will be read. Featured will be the co-sponsorship of three sessions by the Committee on Electric Welding of the American Institute of Electrical Engineers. Robert T. Kenworthy, Exposition Management, 12 East 41st St., New York 17, N. Y.

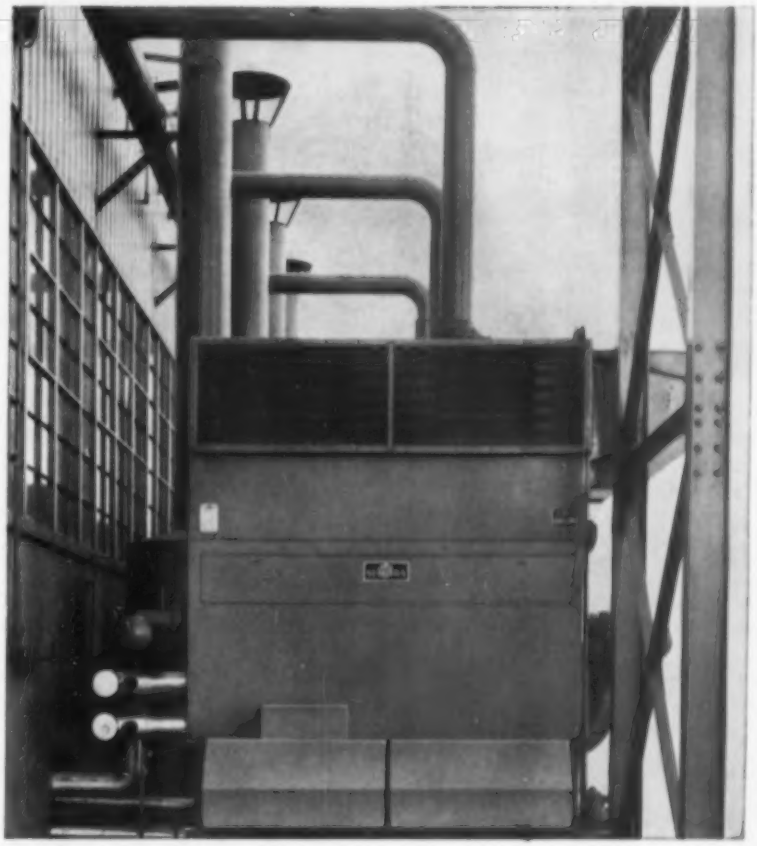
Apr. 9-11: Fifth Welding Show, **American Welding Society,** Convention Hall, **Philadelphia, Pa.** Robert T. Kenworthy, Exposition Management, 12 East 41st St., New York 17, N. Y.

Apr. 10-12: National Nuclear Instrumentation Conference, Instrument Society of America, **Atlanta, Georgia.** Sessions on instrumentation of nuclear power plants, several types of reactors, manufacture of nuclear fuels, unclassified military applications, radiation measurement, and application of nuclear instruments to industrial requirements. Herbert Kindler, ISA, 313 Sixth Ave., Pittsburgh, Pa.

Apr. 29-May 3: 7th National Materials Handling Exposition, Convention Hall, **Philadelphia, Pa.** More than 100 different types of materials handling equipment will be demonstrated and more than 180 companies have reserved space for exhibits with expectations of 250 exhibiting. Theme: Materials Handling, Key to Automation. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

May 20-23: 29th Annual Conference & Exhibit, **Oil & Gas Power Division of The American Society of Mechanical Engineers,** Kentucky Hotel, **Louisville, Kentucky.** ASME, Twenty-nine West Thirty-ninth St., New York 18, N. Y.

HOW YOU SAVE . . .
Getting Drier Compressed Air



Save the cost of Cooling Water and you save the price of the NIAGARA AERO AFTER COOLER (for compressed air or gas) in less than two years.

● Extra, for no cost, you get drier compressed gas or air for your process. You get better operation and lower costs in the use of all air-operated instruments, machines, or paint sprays. You save expense for piping, pumping, water treatment and disposal. You get the use of badly needed water elsewhere in your plant.

Niagara Aero After Cooler cools compressed air or gas (evaporatively) below the temperature of surrounding atmosphere, with no further condensation in your air lines.

Write for complete information; ask for Bulletin 130, or contact nearest Niagara Engineer if you have any problem involving the industrial use of air.

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Niagara District Engineers in Principal Cities of U. S. and Canada

News for the South & Southwest (Continued)

Electric furnace plant for making boron carbide at Huntsville, Alabama.

Norton Company—Ala.

A new industry was officially opened at **Huntsville, Alabama,** when **Norton Company** dedicated its recently completed electric furnace plant.

The new plant will manufacture a variety of electric furnace materials including boron carbide, fused zirconia, fused magnesium oxide, and fused alumina. These materials are becoming increasingly important to American industry because of their ability to withstand extremely high temperatures and wear. Boron carbide, in addition to being the hardest commercially available man-made material, has several applications in the field of atomic energy.

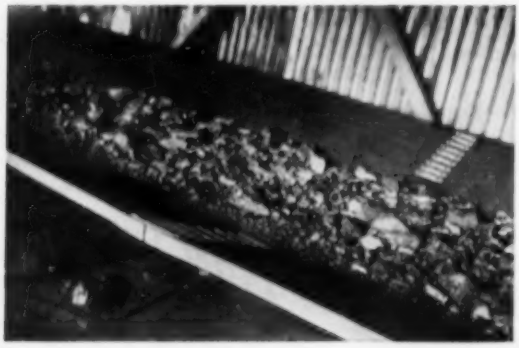
At a later date, facilities for making aluminum oxide and silicon carbide may be added. These materials are used in making abrasive products and high temperature refractory materials.

Edward D. Porter

Edward D. Porter is resident manager of the Huntsville plant which, at the present time, employs about 60 people. Mr. Porter has been with Norton Company since 1948 when he joined the research and development department. Since 1955, he has been associated with the production department. The Huntsville plant is operated by the company's Electro-Chemical Division.

FLEXCO®

BELT FASTENERS and RIP PLATES



FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-112

FLEXIBLE STEEL LACING CO., 4625 Lexington St., Chicago 44, Ill.

Walter Kidde—Southwest

Calvin McCormick has been named director of sales and assistant general manager of **Walter Kidde Construction, Inc.,** Southwest Division, and of **Walter Kidde Engineers Southwest, Inc.,** according to an announcement by William Collins, president of Walter Kidde Construction, Inc., engineers and builders of New York and Houston.

The company has also opened a new branch office at the Louisiana National Bank Bldg., **Baton Rouge, La.,** to expedite the firm's current and contemplated design, engineering and construction projects in the South and Southwest.

The new Baton Rouge office will be directed by **John H. Jurik,** formerly assistant to the manager of Walter Kidde Constructors, Inc. (Southwest Div.), Houston, Texas.

Southern Sales Service

These Manufacturers' Agents Can Serve You

THIS DIRECTORY of Southern & Southwestern Agents representing SPI advertisers is published as a service to plant engineering personnel and not as a part of the advertising contract. Please call our attention to any corrections or omissions. Only manufacturers' agents are listed. For branch offices or direct representatives please consult your Classified Telephone Directory.

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Birmingham

Belcher & Assoc., Inc.—Brown-Boveri Corp.

Brasfield Sales Engr. Co.—J. H. Holan Corp.

S. C. Bratton Sls. Engrs.—Sarco Co., Inc.

Clisby Associates—Sprague Electric Co.

Dixie Engineering—Dollinger Corp.

George S. Edwards—Dean Hill Pump Co.

J. W. Eshelman, Inc.—Air Pre-heater Corp.; Fisher Governor Co.

F. J. Evans Engr.—Webster Engr. Co.

Gauggel Engr. Co.—Leslie Co.; Thos. C. Wilson, Inc.

W. C. Heckeroth—Magnetrol, Inc.; Powers Regulator Co.

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Ind. Furnace Constr. Co. — Cleaver-Brooks Co.

George O. Mabry Co.—Sterling Elec. Motors, Inc.

F. N. Manning — Dameron Enterprises

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Fred S. Middleton Co.—Borden Metal Prod. Co.

Harry G. Mouat—Clarage Fan Co.

William H. Neville — L. J. Wing Mfg. Co.

Newell Equipment Co.—American Monorail Co.

Palmer & Lawrence— American Gilsonite Co.; Marley Co.; Orr & Sembower, Inc.; Prat-Daniel Corp. (Thermobloc)

Hugo A. Puls—Pacific Pumps, Inc.

J. C. Trawick Co.—McQuay, Inc.

W. E. Veenschoten — Copes-Vulcan Div.

Willcox & Allen — Robvon Backing Ring Co.

Mobile

Air Cond. Engineers—Cyclotherm Div.

S. C. Bratton Sls. Engrs. — Sarco Co., Inc.

Bruckman & Co. — Leslie Co.

Frank A. Thomas Co.—The Annin Co.

Montgomery

Building Products, Inc. — Borden Metal Prod. Co.

ARKANSAS

Little Rock

J. L. Brown Sales Co.—Dollinger Corp.; Marley Co.; Sarco Co., Inc.

A. G. Crothers—J. J. Finnigan Co. Inc.

Hurston-Conaway, Inc. — Clarage Fan Co.

Mullins Engineering Co. — Prat-Daniel Corp. (Thermobloc)

Lynton L. Scharff—Manzel

Curtus H. Stout & Co.—Allen-Bradley Co.

North Little Rock

Mill & Mine Supply Co., Inc. —American Monorail Co.

C. O. Miller Co. — American Blower Corp.

Pine Bluff

M. L. Cooper—Subox, Inc.

DISTRICT OF COLUMBIA

Washington

Robert M. Austin—Cochrane Corp.

B & W Sales Co.—McQuay, Inc.

Wm. F. Goddard & Sons — Prat-Daniel Corp. (Thermobloc)

General Hydraulics Co. — L. J. Wing Mfg. Co.

Lyle F. Howe Co. — Peerless Pump Div.

W. E. Kingswell, Inc.—Webster Engr. Co.

L. S. Luther & Company — Cleaver-Brooks Co.

T. W. McGuire Co.—Copes-Vulcan Div. (Vulcan); Prat-Daniel Corp. (Thermix)

Meleny Engineering Co. — Cochrane Corp.; Copes-Vulcan Div. (Copes); Foster Engineering Co.; Magnetrol, Inc.; Reliance Gauge Column Co.

J. C. Patterson, Jr. & Co. — C. H. Wheeler Mfg. Co.

Stone Heating & Ventilating Co.—Dollinger Corp.

Glegg Thomas — Clarage Fan Co.

Washington - Imperial Company—Sterling Elec. Motors, Inc.

FLORIDA

Clearwater

R. J. Clark Equipment — Cyclotherm Div.

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Hayward Equipment Corp.—Webster Engr. Co.

H. L. McMurry & Co.—McQuay, Inc.

Eustis

Earl Richardson Co. Inc. — Warner Lewis Co.

Jacksonville

Barnes Engr. Sls. Co. Inc.—Continental Gin Co.

Belcher & Assoc., Inc.—Brown-Boveri Corp.

Cameron & Barkley Co. — Blaw-Knox Co., Equip. Div. (Grating)

G. R. Copeland—Armco Drainage & Metal Prod. Co.

James M. Grady Co.—American Engr. Co.

T. C. Heyward—Combustion Engr., Inc.; C. H. Wheeler Mfg. Co.

Illingworth Engr. Co. — Cleaver-Brooks Co.; Marley Co.

George A. Israel, Jr.—American Gilsonite Co.

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Mayfield & Son—Elgin Softener Corp.

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Lakeland

Toole Boiler & Welding Serv. Co. — E. Keeler Co.; Orr & Sembower, Inc.

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G. R. MacNamara — Clarage Fan Co.

Ward Engineering Co.—Allen-Bradley Co.

S. D. West Co.—Leslie Co.

St. Petersburg

H. K. Wilson—Copes-Vulcan Div. (Copes)

Tampa

Trice M. Bell — American Blower Corp.

Carter & VerPlanck—Ellison Draft Gage Co.

H. C. (Pat) Flanagan—Copes-Vulcan Div. (Vulcan); L. J. Wing Mfg. Co.

O. H. Howell Mfgrs. Agent, Inc.—Sarco Co., Inc.

H. L. McMurry & Co. — McQuay, Inc.

Tampco Supply Co. — Prat-Daniel Corp. (Thermobloc)

West Palm Beach

J. P. Carroll—Goulds Pumps Inc.

GEORGIA

Atlanta

Abbey Steam Specialty Co.—Armstrong Machine Works

H. Kenneth Adams, Jr. — Geo. D. Roper Corp.

Allen & Vickers Engr. Co.—Cyclotherm Div.

Applied Engineering Co. — Cleaver-Brooks Co.; Lunkenheimer Co.; Manning, Maxwell & Moore, Inc.; Prat-Daniel Corp. (Thermobloc); Todd Shipyards Corp.

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You can get additional badly needed storage space easily and economically in your present building simply by installing platforms of Blaw-Knox Grating. It fits easily, neatly around pipes, beams and machinery without any alterations to your building.

Maintenance costs are slashed into the bargain. There's nothing to wear, nothing to patch. Blaw-Knox grating is self cleaning too. No sharp corners to clog up with dirt, and you'll find painting is easy since all surfaces are easily accessible.

You get maximum open area for plenty of light and ventilation. What's more, its rigid one-piece construction means maximum structural strength and load bearing capacity.

Blaw-Knox Electroforged Grating for walkways, stair treads and floors is fabricated to your specifications to meet your own operating requirements. Complete data on all types is contained in Bulletin 2486. Write for your copy today.

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Equipment Division

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Pittsburgh 22, Pennsylvania

Southern Sales Service (Continued)

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Collins Bearings Co. — Fiske Bros. Refining Co.

F. J. Commagere — McQuay, Inc.

Lewis M. Crowe Co. — Magnetrol, Inc.

John A. Dodd Company — American Gilsonite Co.; Fairbanks, Morse & Co.; Superior Comb. Ind., Inc.

F. J. Evans Engr. Co. — Webster Engr. Co.

Ezell Equipment Co.—Blackmer Pump Co.

The Gearhart Company — Sprague Electric Co.

Alfred Halliday Co.—Dean Hill Pump Co.

Carl Erick Johnson — Prat-Daniel Corp. (Thermix)

Steve C. May—Elgin Softener Corp.; Warren Steam Pump Co.

McBurney Stoker & Equip. Co. —Copes-Vulcan Div.

H. Clay Moore & Assoc. — Sturtevant Div.

Paul H. Nichols & Co.—Pittsburgh Piping & Equip. Co.; Riley Stoker Corp.

Spotswood Parker & Co. — Ellison Draft Gage Co.; Orr & Sembower, Inc.; Reliance Gauge Column Co.; Thos. C. Wilson Co.

C. T. Pottinger & Co. — Clarage Fan Co.

Rumbold & Co. Inc. — Cyclotherm Div.

Earl F. Scott & Co.—Leslie Co.

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Ward K. Stallings Co.—The Annin Co.

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Thermal Engr. Co. — Marley Co.

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Tri-State Utility Products — J. H. Holan Corp.

Will Corp. of Georgia—Dollinger Corp.

Decatur

Abernathy-Thomas Engr. Co. —Leslie Co.

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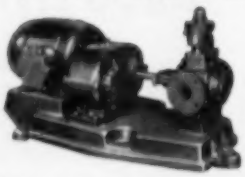

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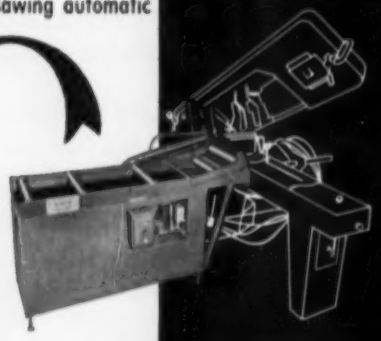

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Paul Simmons Co. — Elgin Softener Corp.

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H. Y. Keeler—Clarage Fan Co.

Surface Combustion Corp. — Webster Engr. Co.

Wheeling

W. J. Thomas — Prat-Daniel Corp. (Thermobloc)

New Plants and Expansions

(*Starts on Page* 32)

of a new industry, **Arkansas Chemical Co.**, in **Malvern, Ark.**

April will see the beginning of the **Kaiser Aluminum & Chemical Co.** $60,000,000 alumina plant in **Gramercy, La.** . . . **Alabama Box Co.** planning move from Wetumpka, Ala. to $150,000 manufacturing plant in **Homer, La.**

Construction soon to be underway on 6,000 barrel naphtha unifiner at **D-X Sunray Refinery** in **Duncan, Okla.**—to cost $10,000,000 . . . $40,000,000 expansion underway in **Tulsa, Okla.** for **Public Service Co.'s** plant.

$80,000 expansion program planned for **Galloway Pipe Guard Co.** in **Beaumont, Tex.** . . . Underway in **Dallas, Tex.** is the $500,000 plant for **Rogersnap Business Forms** . . . $100,000 expansion planned for **Lypta Co.** in **Houston, Tex.** . . . February or March will welcome a new industry —**Houston Reinforced Plastics Co.**—to **Houston, Tex.** at which time the company's $300,000 plant will be completed . . . $500,000 plant underway for **Johnston Testers, Inc.** (recently purchased by Schlumberger Well Surveying Corp.) on a 200 acre site in **Sugar Land, Tex.** . . . **Brazos Electric Power Cooperation Inc.** is constructing a $6,500,000 generating plant in **Weatherford, Tex.** which will be known as **North Texas Plant of Electric Power Corp.**

Kansas & Missouri

Hesston Mfg. Co. constructing its second plant in **Hesston, Kans.** . . . March occupancy anticipated for **American Beauty Macaroni Co.'s** 94,000 sq ft unit being built in **Kansas City, Mo.** . . . $100,000 addition to **Simmons Co.'s** bedding and sleeping equipment plant underway in **Kansas City, Mo.** . . . Underway is the $405,000 expansion and improvement program of **Consolidated Electric Cooperative** in **Mexico, Mo.** and vicinity.

These highlights briefed from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, a monthly publication issued exclusively to SPI advertisers and their representatives through the South and Southwest.

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Instrument Conf. & Exhibit Atlanta, Ga.—April 10-12

"Nuclear Instrumentation" will be the theme of the Third Southeastern Regional Conference and Exhibit of the **Instrument Society of America,** scheduled for April 10-12, 1957, in Atlanta.

The program presentations are being planned by the Nuclear Industry Division of I.S.A., and papers will be presented in these categories: Nuclear Power Plant Instrumentation; Other Industrial Nuclear Applications; Instrumentation in the Manufacture of Nuclear Fuels; Radiation Measurement Instruments. In addition, a six-session Maintenance Clinic will be offered. Maintenance personnel attending this clinic will be instructed in various types of controls and instruments used in industry.

The host Atlanta Section Conference Committee is headed by **M. A. Dailey,** Committee Chairman, and **J. M. Spurlock,** Vice-Chairman, assited by members of the Atlanta Section. The Atlanta Biltmore Hotel will be the center of the Conference activities with an Exhibit Hall housing approximately 100 booths.

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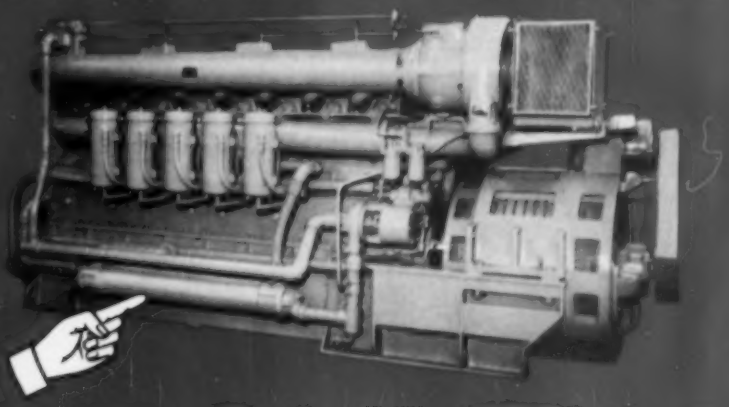
on the move in Venezuela



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